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# ***JPRS Report***

## **Telecommunications**

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# Telecommunications

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## AUSTRALIA

### 'Austel' Regulatory Agency Established

AN890285 Chichester INTERNATIONAL  
TELECOMMUNICATIONS INTELLIGENCE in  
English 14 Jul 89 pp 3-4

[Report: "Australian Telecommunications Act, 1989"]

[Text] July 1st marked a milestone in the development of the telecommunications industry in Australia with the introduction of the Telecommunications Act 1989. The Act establishes Austel, the Australian Telecommunications Authority, an independent regulator for the industry, which will implement a programme of reforms which Mrs Ros Kelly, minister for telecommunications and aviation support, described as "an essential part of our micro-economic reforms, designed as part of a process of structural adjustment of key industries."

Austel's first responsibility will be to administer the CPI-4 price cap to be implemented on Telecom Australia and announced last month by Ralph Willis, minister for transport and communications. Under CPI-4, the average price of standard telecommunications services will fall by at least four percent in real terms over the next three years. (In effect, service prices will be increased by the rate of inflation minus four percent.) The price cap will be reviewed by the government and Austel before the end of the three-year period, however.

Austel's other responsibilities will be for the licensing of value-added and private network services, for the technical regulation of the industry, the promotion of competition with the industry, and for monitoring the efficiency of the three telecom carriers (Telecom Australia, OTC and Aussat) to ensure correct provision of those basic services on which they have retained their respective monopolies. Austel will also have the power to deal with all written complaints made against Telecom Australia which have regulatory implications, while the Commonwealth ombudsman will investigate individual complaints. (The complaints procedure will be reviewed after two years.)

The close scrutiny Austel will exercise over the monopoly services provision is a clear indication that the Australian Government wishes to introduce a similar degree of regulation in Australia as exists in the UK.

Austel will not have much time to find its feet [expression as published]. Mrs Kelly is shortly to ask it to conduct two major reviews into group policy for licensing of private networks and the possibility of licensing a second mobile cellular operator.

Many industry observers, however, feel that Telecom Australia is so firmly entrenched as the monopoly cellular supplier that a second operator would find it almost impossible to establish itself as a viable alternative. MobileNet is provided in all provincial capitals and had 30,000 subscribers in June 1988. Subscriptions were

growing at the rate of 2,000 per month at that time. Telecom Australia predicts 300,000 users of MobileNet by the mid-1990s.

Austel has already been in consultation with industry over the class licenses for VANs and private networks services, and an announcement is expected to be issued relating to them shortly.

Australia's new Industry Development Arrangements with respect to R&D and exports also became operational on July 1st and will run until 1993.

## LAOS

### Accord Signed With Australia on Aid To Build Satellite Station

BK3108093889 Vientiane KPL in English 0902 GMT  
31 Aug 89

[Text] Vientiane, August 31 (KPL)—An agreement on Australian gratis aid to build a satellite earth station was signed here on August 30 between Mr Thongsavat Paset, deputy-minister of transport, communication, post and construction, and Mr Philip Jackson, Australian ambassador to Laos.

The station—to be built in Vientiane with a cost of more than 1,779,900 Australian dollars—will provide round-the-clock telecommunication service connecting Laos with the rest of the world by means of telephones, teleprinters and facsimiles.

Australia will be the transit centre in this telecommunication link through Intersat.

At its initial stage, the station will have 7 channels of telephones and 7 channels of teleprinter service. As the traffic increases, the service of this earth satellite station can be expanded 20 channels of teleprinters and 15 telephone channels.

The station is expected to be completely built and put into operation by the end of February 1990.

## SINGAPORE

### Singapore-to-Hong Kong Undersea Fiber-Optic Cable To Be Laid

55001012b Beijing ZHONGGUO DIANZI BAO in  
Chinese 21 Jul 89 p 3

[Article by Liu Shiren [0491 0099 0088]]

[Summary] Singapore will link up with Hong Kong via construction of an undersea fiber-optic cable system. The new line, a joint project of Singapore's Telecommunications Department and (the U.S. [?division of Britain's]) Cable & Wireless, Hong Kong, plc, will be 3200



kilometers long and system capacity will be 4200 voice circuits; total cost is estimated to be 200 million Singapore dollars.

The Singapore Telecommunications Department also plans—in cooperation with other Southeast-Asian countries—to lay another Brunei-to-Philippines undersea fiber-optic cable system, to be part of a fiber-optic communications network for Southeast Asian nations. This network will include the crucial Singapore-Brunei-Philippines route. The two aforementioned undersea fiber-optic cable systems, via the Southeast-Asian telecommunications network, can be connected into a Singapore-Philippines-Guam-Taipei route and can be joined up with the newly constructed trans-Pacific fiber-optic cable of Japan, the U.S., and Canada.

### TAIWAN

#### **Second Taiwan-to-Hong Kong Undersea Fiber-Optic Cable To Be Laid**

55001012a Beijing DIANZI SHICHANG  
[ELECTRONICS MARKET] in Chinese 10 Jul 89 p 2

[Article by Xue Xinghua [5641 5281 5478]]

[Text] Taiwan's Central Telecommunications Office and Hong Kong's Cable & Wireless, plc, will jointly lay a second Taiwan-to-Hong Kong undersea fiber-optic cable, projected to be operational by October 1990. The new undersea cable will run from Fangshan, Taiwan, to Huojui, Hong Kong, a total distance of 730 kilometers,

and will provide 1890 digital circuits, enough to meet communications demand for the next 5-10 years.

### VIETNAM

#### **Cuban-Aided Microwave Project Inaugurated**

BK1309103589 Hanoi Domestic Service in Vietnamese  
1400 GMT 11 Sep 89

[Report by Xuan Phong: "The Hanoi-Danang Microwave Communications Project Bespeaks of Close Friendship Between Vietnam and Cuba"—portions recorded]

[Editorial Report] Celebrating its 44th anniversary, the Signal Corps has scored a new achievement in completing the construction of a microwave communications line linking Hanoi with Danang.

"The project, with a wave carrier path over 700 km long, consists of almost 300 telephone channels, 206 2-way telegraph channels, a black-and-white television transmission channel, and a radio transmission channel. When the entire project is switched on, original signals, both audio and video, transmitted from Hanoi will be relayed simultaneously to Nam Dinh, Thanh Hoa, Vinh, Dong Hoi, Hue, and Danang. The project also serves Dong Ha and Bim Son with regard to telephone and telegraph links in particular.

The completed Hanoi-Danang communications line helps meet the growing demands for telephone, telegraph, television, and radio transmission as well as for expanding international communications.

## HUNGARY

### Research at Hungarian Telecommunications Institute Reviewed

25020258a Budapest HIRADASTECHNIKA in Hungarian No 2, 89 p 33

[Introduction to special issue by Dr Gyula Tofalvi, scientific director of the Telecommunications Research Institute (TKI)]

[Text] For months I have watched with great attention the efforts of Dr Andras Baranyi to successfully put together a special issue on the TKI which would provide an optimal sampling of the research and development and scientific life at the Telecommunications Research Institute.

He had to attempt this in a double bind.

On the one side, as a leading researcher and scientific adviser for the TKI, he had to have a spiritual and professional compulsion to show all the essential research going on now but from the other side, as leading editor of the TKI column for our scientific journal, he had to know that his available space was so limited that he himself would have to limit his aspirations.

So it was foreseeable that his struggle with limited space and ample material could be solved only by a compromise.

He knew well also that in one special issue he could give only a taste of the rich research and development work and scientific life at the Telecommunications Research Institute which includes digitalization, light telecommunications, space telecommunications, use of new frequency ranges, increasing signal transmission speeds, modern solutions for rural telecommunications, etc. along with analysis of many themes representing basic research and coordination of multi-national technical-scientific tasks.

To see how difficult this search for a compromise could be in the telecommunications theme alone it is enough to note that in this special issue there was no room for the research and development now being conducted in regard to the 140 Mbps, 6 GHz microwave equipment, further development of the INTERCSAT equipment, digital light transmission, devices for digital signal transmission, etc.

Going beyond the research developments mentioned it would have been good to report briefly on or exchange ideas concerning:

- the present achievements and problems of the more than 25 years of TKI-NIIR [Radio Industry Research Institute, Moscow] cooperation,
- preparations for the joint scientific meeting EUROPEAN MICROWAVE CONFERENCE-MICROCOLL to be held in Budapest in 1990,

—the experiences with or lessons of research and development connected with OKKFT-A/5 and OKKFT-G/1 [programs of the National Medium-Range Research and Development Plan] and TELECOM'87,

—the status and future of industrial research in Hungary,

—the international dimensioning of the Hungarian telecommunications industry, etc.

I could go on that in my opinion the readers of our journal would like to hear from those scientists, researchers and developers who, with their scientific foundation in creative work, are capable of reviewing the scientific-professional essence of individual research and development tasks and thus the probable future of the Hungarian electronics industry and of the Hungarian telecommunications industry therein.

I must confess that if I had received Dr Andras Baranyi's task I would not have been able to reach a better compromise under the given conditions than is provided by the special TKI issue now being published.

So what can we promise after all this?

We will continue this reporting in subsequent issues of HIRADASTECHNIKA because it is a pleasure not only to research, develop and create but also to show our achievements and ideas to the surrounding world.

### Ferrite Devices Developed at Hungarian Telecommunications Institute

25020258b Budapest HIRADASTECHNIKA in Hungarian No 2, 89 pp 56-62

[Article by Dr Peter Barsony, Pal Gyuri, and Mrs Daniel Sztaniszlav, Telecommunications Research Institute: "Modern Microwave Ferrite Devices"]

[Excerpts]

#### Summary

The theoretical and practical results achieved in the course of research and development on microstrip and strip line circulators and isolators made it possible to prepare modern microwave ferrite devices at the Telecommunications Research Institute. This article is a review of this activity. [passage omitted]

#### 2. Ferrite Materials

[Passage omitted] The microwave ferrites developed at the TKI [Telecommunications Research Institute] made it possible to build the development of circulators and isolators on a domestic base.

The most important parameters of modern ferrite materials are summarized in Table 1.

Table 1. Characteristics of Modern Ferrite Materials

Material Type	4 Pi M <sub>s</sub> in mT	Delta H in KA/m	tg delta in x10 <sup>-4</sup>	Thermal coefficient in alpha <sup>+50</sup> percent/degrees C <sub>0</sub>	Frequency range used in GHz
YFe garnets	58-180	4.0-8.0	less than 10	-0.05 to 0.20	less than 10
Very low loss garnets (Y-Zr)	100-137	1.0-2.3	less than 5	-0.30	4-8
Temperature Stable Garnets (GdCaInV)	27-60	5.6-9.6	less than 10	-0.01 to -0.09	less than 2
Li ferrites	210-370	35-40	less than 10	-0.08 to -0.10	10-18
NiZn ferrites	480	8.0	less than 10	-0.25	greater than 18

### 3. Design of Strip Line and Microstrip Circulators

[Passage omitted] It was possible to rework the results of Bosma developed for symmetrical strip line circulators (H. Bosma, Junction Circulators, Advances in Microwaves, Vol. 6, Academic Press, 1971) in order to design microstrip circulators and with the introduction of an experimentally determined constant multiplier we derived equations which could be used well in practice (P. Barsony, A Few Problems of Microstrip Circulators, TKI Yearbook, Technical Press, 1975-1977).

Determining the susceptance slope of the circulators is simplified by the recognition that we can calculate it by multiplying by a constant if we know the susceptance slope of the constituent resonators (F. J. Rosenbaum, Integrated Ferromagnetic Devices, Advances in Microwaves, Vol. 8, Academic Press, 1974). The constituent resonator for strip and microstrip circulators is a ferrite resonator connected with one line, so the studies can be limited to this. In the interest of making the calculations more precise we developed an analysis based on computing variation which treats a ferrite resonator connected with one line as a discontinuity problem, reducing the error which was caused earlier by the magnetic field presumed to be a constant in the coupling plane (P. Barsony, A Method for Calculating Anisotropic Planar Circuits, Fifth International Conference on Microwave Ferrites, 1980, Vilnius, and A Method for Analysing the Constituent Resonator of Circulators, Seventh Colloquium on Microwave Communication, 1982, Budapest). This analysis, which can be done on a desktop computer, introduces effective parameters to take into consideration the effect of dispersed fields which always caused a large error earlier in the microstrip case. Using the analysis the design of microstrip circulators can be carried out with a precision of a few percentage points, which is acceptable in practice. On the basis of the model used in the analysis one can also calculate the temperature dependence of the circulators (P. Barsony, Temperature Dependence of Constituent Resonator of MIC Circulators, Eighth Colloquium on Microwave Communication, 1986, Budapest and Analysis of Temperature Dependence of MIC Circulators, Eighth International Conference on Microwave Ferrites, 1986, Ilmenau). The model studies led to the recognition that it would be possible to increase the temperature

stability of circulators if we made the circuit connecting the circulator to the gates with the proper temperature dependence (P. Barsony, On Temperature Stabilization of MIC Circulators by Transformers, 1987 SBMO International Microwave Symposium, Rio de Janeiro). In the case of the most commonly used lambda/4 transformer connection this means that the transformer is formed on a ferrite substrate with a temperature dependence greater than the ferrite resonator so that with increasing temperature the characteristic impedance of the transformer increases, this happens because of the temperature dependence of the resonator part, effectively reducing the deterioration in the circulator parameters. It is possible to derive equations for the design of circulators compensated in this way (P. Barsony, Temperature Stable MIC Circulator on a Composite Substrate, MIOP 88, 1988, Wiesbaden). [passage omitted]

### 4. Developing Microstrip Circulators

[Passage omitted] At the TKI we based the development of microstrip circulators largely on the use of garnet substrates. In this case both the ferrite resonator and the connecting circuit are formed on the same substrate. At higher frequencies we use disk resonators and under 3 GHz we use other type resonators (triangular, etc.) when forming the circulators, in the interest of reducing size.

To achieve the prescribed band width we do the matching with one or two step transformers, keeping in view the requirement that the circuits should be realizable at the smallest possible size. With inhomogeneous magnetization of the transformer sections we were able to increase band width even when using short transformers (P. Barsony, Some Effects of Inhomogeneous Biasing Fields for MIC Circulators, Fourth International Conference on Microwave Ferrites, 1968, Jablonna). For example, one can achieve inhomogeneous magnetization by designing one magnet of the microstrip circulator with a smaller diameter and the other with a greater.

We usually use ferrite magnets—these are the most economical—but in a few cases, for example in the case of a greater temperature stability requirement, we use metal or rare earth metal magnets.

Relying on domestic materials we developed a product family which is used primarily in microwave main line



network systems in the 4 GHz, 6 GHz, 7 GHz and 8 GHz frequency bands. The circulators and isolators embrace the communications bands with parameters of stop-band attenuation greater than 20 dB, pass-band attenuation less than 0.5 dB and a standing wave ratio less than 1.25.

Table 2 summarizes, without trying to be complete, the technical data characterizing the 4, 6 and 8 GHz ferrite devices.

Table 2.

Type	Frequency band in MHz	Typical data		
		A <sub>s</sub> in dB	A <sub>i</sub> in dB	FAHA*
MIP4V	3390-3900	0.4	23	1.17
MIP4Z	3790-4200	0.4	23	1.17
MIP6N	5600-6200	0.5	23	1.17
MIP6Q	5900-6500	0.5	23	1.17
MIP7	7100-7800	0.4	23	1.17
MIP8A1	7700-8500	0.4	24	1.17
MCP8A	7700-8500	0.4	24	1.17

[Note: "FAHA" in the table presumably stands for "specific standing wave ratio."]

We make the isolators out of circulators by terminating and connecting the third gate of the circulators with a 50 ohm resistor mounted on the surface of the garnet substrate. We can make coaxial circulators and isolators by boxing the microstrip ferrite devices and putting on SMA connectors.

We also developed small size, very broad bandwidth devices in boxed versions.

### 5. Development of Strip Circulators

Above 10 GHz, because of the small dimensions due to the high permittivity (a value of about 15) of microwave ferrites and other problems with the microstrip technique, it is useful to make boxed devices with the strip line technique. This generally results in lower pass-band attenuation as well. The 13 GHz ferrite device family is based on domestic Li-ferrite material and was developed in symmetrical tape feed line. The devices are basically three-gate circulators which we mount with an outside terminator for isolator purposes; for multi-gate uses we connect two three-gate circulators together. The connection of the disk resonators is done with a two-step transformer.

### 6. Conclusions

As a result of device development done on the basis of ferrite materials developed at the TKI the institute developed a family of modern microstrip and strip line circulators and isolators with good parameters which is suitable for use in modern third generation microwave systems.

### Analog Subscriber Carrier Frequency Telephone Equipment

25020255 Budapest MAGYAR ELEKTRONIKA in Hungarian No 6, 89 pp 26-28

[Article by Peter Galambos, Triton Small Cooperative: "LEGAFON, 1+1 Channel Analog Subscriber Carrier Frequency Telephone Equipment"]

[Excerpts] For economic reasons the cable system of telephone networks has only limited reserves. [passage omitted] Subscriber networks are often supplemented by single channel analog carrier frequency equipment. [passage omitted]

We developed, on the basis of the Post Office prescriptions, 1+1 channel analog equipment which received a Hungarian patent in 1986. The Triton Computer Technology and Telecommunications Small Cooperative obtained the manufacturing rights and began series manufacture of the 1+1 channel analog subscriber carrier frequency telephone equipment under the name LEGAFON. The equipment satisfies the recommendations of the CCITT and the prescriptions figuring in the transmission plan of the Hungarian Post Office. It satisfies the MEEI [Hungarian Electrotechnical Control Institute] requirements and standards MSZ 10190 and MSZ 172.

By using carrier frequencies on any cable pair of the telephone network the LEGAFON equipment creates an independent transmission channel above the baseband voice frequency range. The baseband range is 0 to 12 kHz, the receiving carrier frequency range is 36.6 to 43.4 kHz and the transmitting carrier frequency range is 60.6 to 67.4 kHz.

The equipment consists of three subunits: an exchange-side unit, a subscriber unit, and a baseband low-pass filter.

When the LEGAFON equipment is used the baseband circuit is connected on the exchange side and on the subscriber side through a low-pass filter, which ensures transmission of the baseband telephone channel in the 0-12 kHz frequency band and prevents the baseband and carrier frequency channels from having an effect on one another. It also separates the carrier frequency signals from the telephone exchange and from the baseband subscriber set.

The exchange-side units of the LEGAFON equipment are used in telephone exchanges in larger numbers so the circuits are placed in a rack system. Printed circuits for 14 exchange-side units can be placed in one box; these include the baseband low-pass filters. They receive power from the DC voltage of the telephone exchange.

There are two versions of the subscriber unit depending on use:

—A single box version is made to set up one telephone station. It gets power from the AC grid or can be



operated by a storage battery. The battery can be charged from the AC grid or by an automatic line charging stage.

- To establish a number of carrier frequency channels in one place (e.g. at a sub-exchange) the LEGAFON subscriber units can be placed in a rack system—similar to the exchange-side units. The group subscriber rack unit can contain four circuits. The AC grid or the local DC voltage supplies the power. A built-in storage battery cannot be used with this version.

The LEGAFON equipment has automatic carrier level regulating circuits. Companding circuits reduce the effect of cable crosstalk from other carrier frequency equipment and other electric interference. Transmission of the 12 kHz fee pulses and of polarity changes takes place in the physical baseband. There is polarity independence for line switching. There are no moving electromechanical parts.

The equipment conserves power. It is not necessary to test or set the carrier frequency when it is installed. LED indicators show operational status. Maintenance is not required.

In order to use the LEGAFON equipment one can use any telecommunications cable pair on which 0-12 kHz frequency range signals are transmitted. The equipment cannot be used in a subscriber net which contains uninsulated overhead wire sections. The maximal attenuation of the line at the higher frequency is 43 dB/50 ohm/64 kHz. In the case of line storage battery charging the maximum permitted resistance of the line loops is 2,000 ohm. [passage omitted]

The LEGAFON 1+1 channel analog subscriber carrier frequency telephone equipment can be used advantageously whenever a new station must be set up but there is no free cable pair. [passage omitted]

A telephone connection and a telex or data transmission channel can be established simultaneously on one cable pair. It can be used for switched data transmission in the 0.3-3.4 kHz frequency band.

Using the LEGAFON equipment together with Telexfon B telex transmission equipment one can use a single cable pair three times. With the aid of a so-called "jump through" filter the LEGAFON equipment makes it possible to realize a continuous carrier frequency connection on several independent trunk circuit sections while using the basic circuits for other purposes.

A four-wire version of the LEGAFON equipment can be used advantageously to set up four-wire data transmission equipment networks so that by using carrier frequencies on the existing telephone or telex cable pairs one can create independent channels in the transmitting and receiving direction, thus creating a real four-wire connection.

The four-wire version can be used for—among other things—establishing two two-wire baseband transmission, releasing the leased four-wire connection, so that one can form two four-wire carrier frequency channels above the baseband transmission. This also makes it possible to have multiple use of the more expensive, limited capacity trunk networks (with one baseband two-wire connection and one carrier frequency four-wire connection on one trunk cable pair!).

## BAHRAIN

### Work on Cable to Link Island With Saudi Arabia Started

55004534a Manama GULF DAILY NEWS in English  
12 Jul 89 p 6

[Article by Colin Young: "Work on Hi-Tech Cable Link Starts"]

[Text] Work has started on a BD980,000 fibre optic telecommunications link between Bahrain and Saudi Arabia, the first of its kind between two Middle East countries. Colin Young reports on the hi-tech system, which will meet demand for telephone, fax, telex and television traffic into the 21st century.

It is hard to believe that a cable measuring just 12mm across and containing eight fibres, each as fine as a human hair, will handle all telecommunications traffic between Bahrain and Saudi Arabia for the next 25 years.

Incredible as it may seem, this is the miracle of fibre optics technology, which has revolutionised the telecom industry.

Very simply, telephone, telex, fax and television messages are turned into tiny pulses of light, using a laser beam.

The information is then sent along the cable, literally at the speed of light—more than 186,000 miles a second—to be decoded into voice, data or television pictures at the other end.

The new cable being laid between Bahrain and Saudi Arabia contains eight of the special glass fibres.

#### Volume

Two will be used for the international link, two for the island's internal network, with four kept as spares for back-up and future expansion.

Salih Tarradah, Batelco's engineering manager for transmissions, said the cable's was large enough to cope with the expected volume of telecom traffic for the next 25 years.

"We have 7,600 voice grade circuits, which means 7,600 simultaneous telephone calls or fax messages," said Mr Tarradah, who is project manager for the Bahrain-Saudi link.

A television signal uses 1,920 circuits and a telex 24, said Mr Tarradah.

"The present microwave link has a capacity of 300 circuits, of which we are using only 200, so 7,600 is more than enough for our requirements," he said.

Bahrain's share of the BD980,000 project is BD400,000. Transportation Minister Ibrahim Humaydan signed the contract in Jeddah a year ago with his Saudi counterpart, Dr 'Alawi Kayyal.

Countries wishing to communicate with Bahrain or Saudi Arabia, but which do not have a direct link, will be able to route calls through the new link, said Mr Tarradah.

Work has started to lay the cable from Batelco's 'Isa Town exchange through underground ducts to the customs post on the King Fahad Causeway, a distance of 28km.

#### Protected

On the Saudi side, the link runs from Al Khubar in the Eastern Province to the Causeway.

The two will join together, making a total length of 70km, by the end of the year, said Mr Tarradah.

"We could have put the cable under the sea, but it makes sense to utilise the Causeway, making it easier to install and maintain and keeping it well protected," he said.

Japan's NEC is the main contractor, with Sumitomo, another Japanese company, supplying the cable.

Batelco engineers have been to Japan and the US for training on the project.

The new cable should mean less echo and interference on telephone lines between the two countries, according to Mr Tarradah.

"The microwave link is very good, but sometimes we get problems of fading and degradation of quality," he said.

"The fibre optic system is immune to climatic changes and is more reliable over-all than the microwave."

Mr Tarradah's involvement in the project goes back six years.

Even as the Causeway was being built, the two neighbouring countries were talking about using it to carry communications.

#### Future

Originally it was planned to opt for the more traditional co-axial cable, which is used for the international telecom link between the Kingdom and Kuwait.

It was finally decided to go for the latest hi-tech system and future plans could include a fibre optic cable between the island and Kuwait.

Batelco cable co-ordinator Ja'far Muhammad said fibre optics were first introduced in Bahrain in 1985, when a 13km cable was laid between the central exchange and Salmaniyah and 'Isa Town.

The technology is being gradually increased in the island network under the company's development programme.

#### **Radio-Courier Plan for Mail Delivery Reported**

55004534b Manama *GULF DAILY NEWS* in English  
6 Jul 89 p 1

[Article by Soman Baby: "Super-Fast Island Mail on the Cards"]

[Excerpts] Bahrain may get a new, super-express mail service, with letters and parcels delivered anywhere on the island within hours of posting.

Courier-style postal vehicles would tour the island, waiting for a radio alert that a customer had urgent mail to be collected.

The new service is just one of the many projects in store to develop and improve the island's postal network, says the Director of Posts, 'Ali Matar.

[passage omitted] "Plans are now underway to introduce an Inland Barid Mumtax, or express mail, which will ensure the delivery of local mail on the same day, probably within hours."

#### **Approval**

"People with urgent letters or documents could then dial a particular telephone number at the postal directorate, which will direct its drivers, who will move around Bahrain in vehicles equipped with radio telephones," he said.

Mr Matar said the service would be introduced subject to the approval of the cabinet. [passage omitted]

## **BANGLADESH**

#### **Bangladesh, Iraqi News Agencies To Cooperate**

55500120 Dhaka *THE BANGLADESH OBSERVER* in English  
4 Aug 89 p 10

[Text] An agreement between United News of Bangladesh (UNB) and Iraqi News Agency (INA) was signed in Dhaka on Thursday for exchange of news between the two news agencies, says a Press release.

Iraqi ambassador in Dhaka Zuhair Muhammad Al-Omar initialled the agreement on behalf of the Director General of INA while Enayetullah Khan, Chief Editor of UNB for his organization.

## **INDIA**

#### **Agreement Signed for Lease of Arabsat Satellite**

BK3108132289 Delhi *Domestic Service in English* 1230  
GMT 31 Aug 89

[Text] New Delhi has signed an agreement with the Arabsat Satellite Organization, a consortium of Arab nations. Under it, its 12-C band transponders on board the Arabsat spacecraft will be secured on lease for 2 years to provide backup to the Indian national satellite system for augmenting its capacity.

#### **Reportage on Problems With Communication Satellites**

##### **Possible INSAT-1D Launching**

55500119 Bombay *THE TIMES OF INDIA* in English  
10 Aug 89 p 8

[Article: "INSAT-1D Launch Likely in March"]

[Text] New Delhi, August 9: INSAT-1D is likely to be launched between March and June 1990. It suffered only minor damage during the launch-pad mishap in June.

A high-level Indian team which visited the U.S. last month has assessed that the damage was limited to the satellite's top portion consisting of the C-band antenna reflector and the east panel on which certain components are mounted.

INSAT-1D's scheduled launch from Kennedy Space Centre, Cape Canaveral, was postponed in June when a hook, hoisting it to the launcher rocket, fell on it and caused some damage.

It was the replacement for the INSAT-1B, which will run out of fuel in October and rendered non-operational. Another replacement satellite, INSAT-1C launched in 1987, has also be working at 50 per cent of its capacity owing to problems in its power bus.

According to a government statement today, the team of experts, after analysis, has concluded that other components of the satellite have not been subjected to any severe shock owing to the hook's impact.

Based on inspection, testing and analysis, the components that would need replacement and repair have been identified. Work is in progress to replace the damaged C-band reflector.

An extensive test programme to ensure the flight worthiness of the satellite has been evolved and will be carried out after the C-band antenna is integrated with the spacecraft.

It has already been inspected, all alignments checked and powered to verify the functioning of the electrical sub-systems and payloads, including the solar array and its deployment mechanisms.



The team of experts were from the departments of space, telecommunications, ministry of information and broadcasting and the India meteorological department.

### Need To Preserve Services

55500119 Madras *THE HINDU* in English  
10 Aug 89 p 8

[Editorial: "Satellite Options"]

[Text] Now that the damage to the INSAT-1D satellite has been assessed and its launch rescheduled to take place only after March next year, the Government needs to finalise the contingency plans to maintain the continuity in television and telecommunication services when the trusted and long-serving INSAT-1B reaches the end to its life. The six-year-old satellite is not dead yet, but if the calculations are right, the fuel left on board may not keep it in stable orbit for very much longer. The satellite will continue to bounce back signals even after the fuel runs out, but it will tend to wobble about its slot above the Indian Ocean, and this is where trouble begins. There are about 80 terminals across the country, not counting Doordarshan's 272 stations, that interact with the satellite, their antennae steadfastly pointed at it. Yet only the few located at the metropolitan centres have auto tracking facilities capable of retaining drifting satellites in their sights. So when INSAT-1B begins to drift about (or go into inclined orbit), it will not be dead technically speaking, but it will turn useless as far as most of the antennae around the country are concerned. The Telecom Commission's reported decision to import auto tracking equipment for all the 80 terminals with deliveries targeted for next year may be a case of closing the stable doors after the horses have bolted. For by the time the facility is installed, a stable INSAT-1D might have become operational. The auto tracking equipment will be best be an investment for a future contingency.

Considering the imminence of INSAT-1B lapsing into an inclined orbit, there appears no escape from an interim arrangement, of leasing capacity on another satellite. The Government is only too well aware of the consequences of any disruption in satellite services, especially Doordarshan's, in this election year and therefore no effort has been spared in the bid to secure alternative satellite capacity. For the national television network served almost exclusively by one of INSAT-1B's two S-band transponders, there is a ready alternative in INSAT-1C. One S-band transponder on board this crippled satellite is in working order—the other is not—and conceivably can take over the burden. But the lack of a second S-band transponder, now being used on INSAT-1B for a host of services including a regional television transmission to Tamil Nadu, will be a serious handicap. If telephone services are not to be disrupted, there seems to be no option to leasing capacity on offer from Arabsat, run by the League of Arab States. The location of the Arabsat satellites, low on the western sky when viewed from India, and their beam patterns or footprints may

not be exactly ideal, but experts believe that the proposition is technically feasible. A number of other options are reportedly still being pursued. What the Government needs to do is to firm up quickly the contingency plan for there is plainly a need for one. Ail this to maintain satellite services as they are today. In this crisis it is easy to forget that even the existing capacity on one and a half satellites is inadequate to meet demand; INSAT-1C had been almost fully booked even before it was launched. When the short circuit on board reduced its capacity by half, new leased services including one for business users were put on hold and remain so even today. But for the moment that is hardly the matter; preserving the existing services is of the essence.

### Steps for Satellite Reception Enhancement

55500121 Madras *THE HINDU* in English  
25 Aug 89 p 7

[Text] New Delhi, Aug 24—An official team of Arabsat, the consortium of Arab countries that owns two communication satellites, is arriving here on August 27 on a five-day visit during which a formal agreement is expected to be signed to enable the Indian government to lease transponders on its satellite positioned above the African continent.

The terms and conditions of the lease, which has been necessitated by the delay in the launch of Insat 1-D, are expected to be more favourable than what is usually offered by Intelsat. Even though the occasion of Arabsat at 26° east, low on the western sky when viewed from many parts of the country, is not ideal, official sources here said that in the absence of any other space segment available, the Government had decided to go in for Arabsat as it was the nearest substitute.

Though the lease is likely to run for two years, India will have the option to withdraw after a year, by which time Insat 1-D is expected to be in service.

Orders for auto track units: Alongside, orders are likely to be placed next month on Vertex Company of USA for the supply of 42 auto track units and eight other auto track equipment valued at \$4.5 millions. Vertex of USA has reportedly qualified on both the technical and price bids following tenders floated some time earlier this year. At present there are five 11 metre auto track antennas positioned in the four metropolitan cities of Delhi, Bombay, Calcutta, Madras and at Shillong. Besides there are a number of earth stations with 4.5 metre and 7.5 metre antennas. The sources said in view of the 'urgency', Vertex has been told to supply the auto track antennas at the earliest. The first batch is expected to arrive in India by December and the remaining antennas would be delivered before March 1990.

The auto tracking units would be largely used for Insat 1-B, which, the manoeuvres conducted in the first week of August indicated, has enough fuel to remain operational at least till middle of May 1990. In other words, the sources said the satellite would be usable without



much tracking effort from the ground. Once Insat 1-B went into 'inclined orbit' the use of auto tracking units would become necessary. The sources were hopeful that Insat 1-BN would remain usable for the greater part of 1990. They said while the 41 imported units would replace the existing 4.5 and 7.5 metre antennas respectively, the latter or the recovered antennas would also be converted into track tracking units with indigenous effort and deployed in new earth stations. The total requirement of such antennas taking into account the needs of border towns, pilgrim centres, etc. has been estimated at over 200.

**Insat 1-D fault rectification:** Referring to Insat 1-D, they said the team which visited the Ford Aerospace manufacturing facilities at Palo Alto found that the satellite's major C-Band antenna had been damaged. It is now learnt that the damage in all probability would be rectified by November and the testing and integration of all the facilities completed in four months beginning December 1989. While the Indian authorities had indicated to the launchers of the satellite, McDonnell Douglas, that the launch could be between March and June 1990, it is now understood that an early rectification of the fault in Insat 1-D should open up the possibility of its launching perhaps in April 1990.

The sources said, till mid-May 1990, the existing satellites in space should meet both the broadcasting and telecommunication requirements of the country and they did not anticipate any crisis whatsoever. The authorities were also contemplating moving Insat 1-B to the inclined position earlier than anticipated to save fuel and also extend its life. This way, they said the satellite could be used for a longer time and would also be far more cost effective than taking the Intelsat transponders on lease. While the lease money charged by Intelsat for C-Band was \$850,000 per year per transponder, it was nearly over a million dollars annually for S-Band transponders. In fact, sending the satellites on inclined orbits just before the full fuel was used up and then using the auto tracking units was a much more cost effective proposal, the sources contended. This new method was being tried out by a number of developed countries, they pointed out.

### Switching System Based on Indigenous Technology

55500118 Madras THE HINDU in English  
6 Aug 89 p 2

[Article: "Clearance for ITI Unit"]

[Text] New Delhi, Aug 5. The Union Government has cleared the public sector Indian Telephone Industries (ITI) proposal to set up the second electronic switching system (ESS) factory in Bangalore based on indigenous C-DoT technology. Besides, it has accorded in principle approval to the Rae Bareilly unit of the ITI to manufacture digital electronic exchanges based on home technology. The two proposals together envisage production of

700,000 lines (600,000 lines in Bangalore and 100,000 lines in Rae Bareilly) of digital electronic exchanges annually.

Highly placed sources told THE HINDU that instead of going in for a single unit of 500,000 lines capacity ESS factory like the one at Mankapur in Gonda district of Uttar Pradesh based on Alcatel technology, the emphasis has shifted to more number of smaller units. Since the cost of proposed exchanges with smaller capacities was well below Rs. 20 crores, the Telecom Commission felt it would be able to save time by eliminating the bureaucratic delays involved in getting clearances from the Public Investment Board (PIB) which had a statutory obligation to examine all investment decisions relating to public sector projects with cost over Rs. 20 crores. The Commission also has a mandate to take independent decisions on monetary matters below Rs. 20 crores.

Accordingly, in the last week of July, the Department of Industrial Development gave clearances to set up three units for making digital exchanges. They will be set up at Hosur with a capacity of 300,000 lines, Bangalore unit of ITI with 200,000 lines and a 100,000 lines capacity unit at the existing facilities available at Rae Bareilly. Besides, permission has been granted to manufacture exchanges with a total 100,000 lines capacity in Bangalore based on ITI's own technology. Except perhaps for the Hosur unit where new facilities would be set up, the remaining 400,000 lines would be produced from the existing facilities. Alongside the workers were being retrained to absorb and use the new technology. Till now they had been trained in using only strowger and cross-bar technology.

**Older versions to be phased out:** Following the decision to set up digital exchanges, the older versions of strowger and crossbar exchanges would be phased out.

The C-DoT has set up a model production plant jointly with ITI for the manufacture of 100,000 lines a year for electronic switching system. Over 140 units of 128 port RAX had been produced by the beginning of May by ITI and 90 were in operation by that month. In addition, technology had been transferred by C-DoT to 13 manufacturers. In July, 1989 commercial production clearance for 512 port MAX had been provided for 20 systems. Further C-DoT technology for EPABX (128 port) had been transferred to 36 parties and 600 units manufactured by over 20 C-DoT licensees were working in the field. Commercial trial of C-DoT's 16,000 port MAX at Ulsoor in Bangalore has commenced and according to Commission sources, indications are that it would be a success. Already based on this technology a modular exchange with a capacity of 4,000 lines is being installed at Ulsoor and subscribers are being given new telephone numbers on that basis.

Further, orders for another 200,000 lines of exchange equipment is likely to be placed on 10 private sector parties (20,000 lines each). An announcement regarding these decisions is likely to be made by Mr. S. G. Pitroda,

Chairman, Telecommunication Commission on August 25, when C-DoT completes five years of its existence Mr. Pitroda now on a visit to the United States is likely to return on August 14.

**New policy likely:** Since the existing private and joint sector parties are already in the telecom business making 128 RAX and 128 PABX based on C-DoT technology, they will be associated with the ITI by supplying it with cards and other components. It is in this context, the Telecommunication Commission is contemplating introducing a new telecom manufacturing policy incorporating necessary changes in the industrial licensing procedures.

Simultaneously, the commission hopes to make the working of the private sector simpler and effective by placing advance orders. For instance, the much publicised RAX-a-day programme of the Department of Telecommunication based on C-DoT technology suffered seriously because neither the manufacturers in the private sector nor ITI were in a position to supply the full complement of equipment.

To simplify the rules, the Commission has decided to depackage the ordering system under which the manufacturers need supply only the RAX while DoT would buy the sub-systems and power packs from elsewhere. In this manner, the sources said all the manufacturers would be able to keep their units fully utilised. Orders for 200,000 lines to be equally shared by the 10 manufacturers would be placed by the Telecom Commission in September. The manufacturers would be allowed to import certain components not being manufactured indigenously on a three-year requirement basis.

Though the grand plan of the Telecom Commission is indeed welcome based as it is on a national effort, critics within the Commission point out that making smaller exchanges is fine, but what about the metropolitan cities and major metros where the exchanges have to be necessarily big they ask. Perhaps Mr. Pitroda would be able to answer it on his return from the United States.

#### **New Telecommunications System Planned for Orissa**

55500122 Bombay *THE TIMES OF INDIA* in English  
25 Aug 89 p 3

[Text] Bhubaneswar, August 24—An indigenously-built "radio-sharing" telecommunication system will soon be introduced as a pioneering venture in Orissa's Koraput district to cover some of the most inaccessible villages.

The telecom department is understood to have thought of trying out the novel experiment because of the difficulty in running open-wire lines across remote, inaccessible areas.

The high-technology system is expected to cover 118 village panchayats of the tribal-dominated district. The

equipment for the system is expected to be manufactured by a Visakhapatnam-based firm.

Meanwhile, with the opening of six new subscriber trunk dialling (STD) routes in Orissa by the Union minister of state for communications, Mr Giridhar Gomango, recently, the state now has 29 STD stations. The new centres are Jajpur Road, Damanjodi, Bolangir, Burla, Hirakud and Khurda.

Of the 13 district headquarters in Orissa, 12 now have STD links. The only exception is Bhawanipatna in Kalahandi district which is expected to get the facility by the end of this year.

According to Mr Gomango, the total capital investment in telephone exchange and transmission media projects in the state was an estimated Rs 2.9 lakhs.

The Orissa telecomcircle, he said, had provided 30 new rural exchanges, 130 long-distance public telephones in the remote areas and 11,295 new lines in telephone exchanges in the last financial year.

In the current financial year, 8,000 new telephone connections are expected to be given. The new digital telephone exchange to be commissioned in Bhubaneswar by October is expected to totally wipe out the waiting list for connections in the state capital.

During his recent visit here, the communications minister said that with a view to streamlining communication facilities in the rural areas, all panchayat headquarters would have branch post offices by 2000.

Today, out of the 200,000 gram panchayats in the country, about 120,000 have post offices. The rest will be given the facility in a phased manner in the next two five-year plans.

#### **Television Transposer Commissioned in Rajasthan**

BK1709020289 Delhi *Doordarshan Television Network*  
in English 1600 GMT 16 Sep 89

[Text] A new television transposer has been commissioned in (?Bhilwara) District in Rajasthan. The 10-watt transposer is the first of its kind in India. The union minister of finance, Mr S.B. Chavan, inaugurated the transposer this morning. The commissioning of the equipment will help in amplifying programs telecast from Jaipur and will effectively have a cover range of 15 km.

#### **OMAN**

#### **Demand for Digital Exchange Services Intensifies**

55004535b Muscat *AL-WATAN* in Arabic 31 Jul 89 p 4

[Article by Mu'min Khalifah: "Official Source at the Telecommunications Authority to AL-WATAN:

**Demand Intensified Recently for Digital Exchange Services; Speed dialing and Unlisted Numbers Are Most Popular"]**

[Text] An official of the Telecommunications Authority said that demand for digital exchange services has risen sharply over the past few months and that speed-dialing and unlisted numbers have become very popular recently with citizens and residents after they proved successful and helped eliminate some complaints of unsolicited calls.

The official asserted that the fees charged are not high in relation to the services, which cost five riyals. More than two services costs 10 riyals. Each service requires a monthly charge of 500 bisa to be paid in advance in three-months lump sums. The exception, he added, is speed-dialing which costs 500 bisa for each 10 additional numbers, one Omani rial for 20 numbers, or 1.5 Omani riyals for 30 numbers.

He said the Authority currently offers 12 kinds of services: speed-dialing, call-forwarding, the instantaneous transfer of incoming calls to a recorded message (unavailable subscriber service), call-waiting, do-not-disturb calls, a service to reach a specific number determined by the subscriber (hot-line that activates after a specific time lapse after the receiver is lifted, conference calls that enable a subscriber to talk to three people simultaneously, a service that prevents calls to specific destinations designated by subscribers, and wake-up calls.

The last service is automatic redialing which enables a subscriber to reconnect to the last number dialed using an abbreviated code.

It is to be noted that there are two types of telephone exchanges and that some of them lack some of these services.

In another development, AL-WATAN learned that the planned new earth station for the Atlantic satellite will be built outside Muscat in order to facilitate communication operations.

The earth station will be part of a project to expand the country's telecommunications network. The Sultanate currently owns earth stations capable of receiving the Arab satellite ARABSAT, the INMARSAT satellite over the Indian Ocean, and the Intelsat system. It also has eight other earth stations for domestic services. These are the Wadi al-'Amirat station in Muscat and al-Ma'murah in Salalah which are equipped for television transmission and reception as well as for cable and wireless communications; the two stations of Khasab and Masirah which are used for cable and wireless communications and television reception, and the stations of Saham, Nazwah, Sur, and al-Buraymi which are only used for television reception.

**Minister Discusses Telecommunication Development Plans**

*55004535a Muscat AL-WATAN in Arabic 18 Jul 89 p 4*

[Interview with PTT Minister Ahmad Bin-Swaydan al-Balushi by Mu'min Khalifah: "The Minister of Post and Telegraph States: We Are Diligent in Bringing Post and Telegraph Services to All Regions Without Distinction; We Have Studies and Plans for the Development of Telecommunications Through the Year 2005"; date and place not given]

[Excerpts] PTT Minister H.E. Ahmad Bin-Suwaydan al-Balushi told AL-WATAN that the postal and telecommunications services currently available to all citizens throughout the country are among the most sophisticated government services, and that the Sultanate presently enjoys a modern postal and telecommunications network.[passage omitted]

In his exclusive statement to AL-WATAN, H.E. added, "We are planning several projects for the future because our country is forever developing and growing. The current expansion of the telephone network at al-Batinah Coast and the Salalah region is scheduled for completion next year, God willing. Studies are also being made to assure the availability of communications services in general, and telephone services in particular, to all citizens and all private and public sectors throughout the country."

PTT Minister H.E. Ahmad bin Swidan al-Balushi told AL-WATAN, "Furthermore, I would like to mention that we have taken long strides towards Omanizing administrative and technical jobs at the ministry in compliance with the policy of replacing foreigners with Omanis in all positions. We are diligently pursuing the 100 percent Omanization of jobs, as mandated by His Majesty the Great Sultan."[passage omitted]

As to extending communications networks to all parts of the country, H.E. said that with the completion of the al-Batinah project and its various extensions, networks will have covered all major towns in the Sultanate. There will only remain small villages which would receive telephone services in accordance to plan. Telecommunications projects are not carried out haphazardly but with important considerations in mind. We all realize that implementation is difficult because of the desert nature of our country. We therefore began with Muscat and Salalah, followed by developing communications in regions of the interior where we covered all major and important cities. Then we began work on the al-Batinah Coast project; so on and so forth until, with God's help, we bring the service to every town and village in the Sultanate. This has always been our objective.

PTT Minister H.E. Ahmad Bin-Suwaydan al-Balushi told AL-WATAN: For example, the first stage of the al-Batinah Coast project will make 16,680 telephone lines available to the governorates of Sahm, Barka', al-Khaburah, al-Suwayq, Quryyat, al-Rustaq, and to a



number of their villages. We aim to accomplish this under the current third five-year plan. In addition, the Telecommunications Authority is undertaking extensions that will considerably increase the number of telephone lines in the al-Batinah region.

As to projects contemplated under the third five-year development plan, H.E. said, our objective is to bring communications services to the far-flung reaches of the country, not only to Muscat, as evidenced by the al-Batinah project. Another indication of our attentiveness to regions of the interior is the communications development project under the current plan. This project is to serve 39 towns and villages and provide 27,712 telephone lines. Some existing exchanges will also be expanded.

H.E. Ahmad Bin-Suwaydan al-Balushi, PTT minister, concluded his exclusive statement to AL-WATAN by emphasizing that his ministry is currently evaluating studies and plans for the development of telecommunications in the Sultanate through the year 2005.

## PAKISTAN

### Communications Modernization Planned

55004709 Karachi DAWN in English 21 Aug 89 p 6

[Text] Karachi, Aug 20: The Telegraph and Telephone Department has undertaken various measures to modernize the communication system to provide better facilities to the consumers.

This was observed by Mr S.A. Siddiqui, Director-General, Pakistan Telegraph and Telephone Department during an informal conversation with some journalists on Sunday.

The Government has prepared an ambitious 7th five-year plan of Rs 55 billion with a foreign aid component of about Rs 3 billion to modernize the telecommunication system in the country by overhauling the outdated equipment or replacing them with modern ones.

He said the long digital telecommunication transmission system would be introduced in the country soon by laying optical fiber cable as main artery of the communication between Karachi-Islamabad via Multan, Sahiwa, and Faisalabad.

In fact, the outdated coaxial cable network was being replaced by the sophisticated optic-fiber system; the switching system being replaced with computer system which would increase efficiency of trunk traffic and reduce time.

He also hinted introduction of computer system for enquiries and complaints by scrapping the manual system and hoped the menace of cross-talks would also go with the modernization of exchanges in the city and other facilities with the introduction of digital exchanges in phases.

To a question, he said nearly 300,000 applications for the new telephone connections were pending disposal, adding Karachi has 300,000 connections at present. During the five-year plan, now under way, he said 1.5 million new phone connections would be given to clients in the country. There were over 700,000 applications for new connections awaiting disposal, in the country.

He said the T and T had surpassed its target of 90,000 telephone exchanges lines by installing 5,000 new lines in 1988-89.

Besides, he reiterated that financial target fixed for the last fiscal year had also surpassed. The T and T realized net revenue receipts of Rs 7,654 million against the target of Rs 7,561 million in 1988-89.

To another question, he said people of Pakistan would soon have car-telephone facilities. Arrangements were in hand to introduced the mobile telephone facilities soon, besides, computerized telephone directories.

In reply to another question, he said the Government had agreed to make the T and T Department a corporation for which details were being worked out.

### Broadcasting Expansion Program in Baluchistan

BK2408073789 Islamabad Domestic Service in Urdu  
0600 GMT 24 Aug 89

[Text] The Baluchistan chief minister, Nawab Mohammad Akbar Khan Bugti, laid the foundation stone for 10 kw Loralai radio station in Loralai this morning. This will be the fifth radio station in the province. Speaking on the occasion, he said radio is an effective medium to apprise the people of the latest situation and to provide them with explanations. He said Baluchistan is a large province and therefore the range of radio broadcasts should be expanded. He expressed the hope that the Loralai radio station will fulfill the expectations of the people of the region. The chief minister specially appreciated the Pakistan Broadcasting Corporation for spending 21 to 22 percent of its development funds in Baluchistan. He said this amount is quite sizable, which will greatly help in expanding the range of broadcasts in Baluchistan.

Earlier, in his welcome speech, the chairman of the Pakistan Broadcasting Corporation discussed the salient features of broadcasting projects in Baluchistan. He said in Khuzdar, a 300 kw transmitter will begin operation by the end of this year at a cost of 770,000,00 rupees. He said in Baluchistan, the sixth radio station will be set up in Judd for which land has been acquired and the primary work is being completed to begin work on this program at the earliest. He said this radio station will be completed by March 1991. Under another project to be implemented expeditiously, a [word indistinct] broadcasting is being set up in Sibi. It will be completed within the next few days. Another project in Baluchistan is that of a 100 kw medium wave transmitter to be installed in Quetta.



## SAUDI ARABIA

**Telecommunications Equipment Plant Begins Production**

55004536 Jeddah ARAB NEWS in English  
13 Aug 89 p 3

[Article by Muhammad Ibrahim, Arab News Staff: "SCC Telecom Factory Starts Operation"]

[Text] Jeddah, Aug. 12—Saudi Cable Company's (SCC) new telecommunications factory at the industrial city here has started the production of copper telephone cables with an output amounting to 60 percent of the targeted annual capacity of 1.6 million conductor kilometers which can be raised to 2.4 million. "We have completed the commissioning phase and begun the trial runs so as to reach our planned capacity," Muhammad Hilmy Amjad Kutbi, SCC assistant vice president, Telecom Cable Plant, said.

He told Arab News that the factory has already supplied the PTT Ministry and its contractors with its production of fully manufactured copper telephone cables to be used at its various projects. "We will compete in the various contract-tenders to be offered by the ministry and will also market our production in the GCC countries and abroad," he added.

Kutbi pointed out that before the end of the year the plant will produce optical fiber cables with a capacity of 6,000 kilometers of optical fiber cables per year. This represents the second phase of production at the multi-million riyal plant, he added.

"In two months time we expect to finalize the framework of an agreement for technical cooperation with a leading international company for the production of optical fiber cables and hope to begin production before the end of the year," Kutbi said attributing the delay in this line of production to the company's keenness to adopt the latest technology in this field.

The third phase of production at the plant will be the manufacturing of electronic equipment used in the telecommunication transmission system such as transmitters, multiplexers (MUX), coders, receivers and others.

The plant covers an area of 37,500 square meters and is being manned by 150 personnel consisting of operators, technicians and administrators.

Through the technical partner, Nokia-Mailiefer of Finland, a number of Saudi employees were trained abroad in Finland, Sweden and Switzerland. The same partner has also provided on-site job training.

Kutbi said many national staff were appointed to work at the plant and are being thoroughly trained in all production lines.

**Saudi Arabia, Bahrain Start Fiber-Optic Link**

AN890283 Chichester INTERNATIONAL  
TELECOMMUNICATIONS INTELLIGENCE in  
English 4 Aug 89 p 3

[Report: "Fiber-Optic Link Between Bahrain and Saudi Arabia"]

[Text] Work has started to install a 70-km fiber-optic telecommunications cable link between Bahrain and Saudi Arabia—the first of its kind between two Middle East countries.

The BD980,000 (2.6 million dollars) project is designed to provide sufficient capacity to handle telephone, telex, fax and television traffic between the two countries through the 1990s. The new cable system will comprise eight glass-fibres; two for international links, two for the island's internal network, and four kept as spares for back-up and future expansion. The cable will have a capacity for 7,600 voice-grade circuits allowing 7,600 simultaneous telephone calls or fax messages, a TV signal using 1,920 circuits and telex 24 circuits. The present microwave link has a capacity of only 300 circuits.

In Bahrain, the cable will be laid from Bahrain Telephone Company's (Batelco) Isa Town exchange through underground ducts to a customs post on the King Fahd Causeway, a distance of 28 km. On the Saudi side, the link will run from Al Khobar in the Eastern Province to the Causeway, where the two cables will be joined together.

Saleh Tarradah, Batelco's engineering manager for transmission and project manager for the Bahrain-Saudi link, said, "We could have put the cable under the sea, but it makes sense to utilise the Causeway, making it easier to install and maintain and keeping it well protected."

Japan's NEC is the main contractor with Sumitomo, another Japanese company, supplying the cable.

According to Batelco, originally it planned to opt for the more traditional coaxial cable, which is used for the international telecom link between the Kingdom and Kuwait. However, it was finally decided to go for the latest high-tech system; and future plans could include a fibre-optic cable between the island and Kuwait.

The use of fibre-optic technology is gradually being increased in the island's telecommunications network under Batelco's development programme. The technology was first introduced in Bahrain in 1985 when a 13-km cable was laid between the central exchange and Al-Salmaniyah and Isa Town.

NEC has recently had success in obtaining an order as joint prime contractor to construct a submarine fibre-optic telecommunications cable for the Malaysian section of the ASEAN project.

## EUROPEAN AFFAIRS

### **Dornier Turns Over ERS-1 Receiving Station to ESA**

AN890284 Chichester *INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE* in English 4 Aug 89 p 12

[Report: "Main Receiving Station for ERS-1 Satellite Handed Over"]

[Text] Friedrichschafen-based Dornier GmbH has handed over the main data receiving station for the European remote sensing satellite project (ERS-1) to the European Space Agency (ESA) in Kiruna, northern Sweden. The ERS-1 is currently being built by an international consortium comprising 12 European countries, the USA and Canada and is scheduled for deployment into orbit at the end of 1990 with an Ariane launcher. Dornier is the lead contractor in this consortium of more than 50 companies.

ERS-1's scientific earth and applications-oriented observation tasks will include maritime research (wave spectrum), environmental monitoring (oil spills at sea, forest damage detection), shipping and ship route monitoring, detection of deposits for geological purposes and cartographical tasks, in particular in bad-weather areas.

## CANADA

### **Supreme Court Says Telephone Regulation Up to Ottawa**

55200054 Toronto *THE GLOBE AND MAIL* in English 18 Aug 89 p B6

[Article by Lawrence Surtees]

[Text] The federal government will make a statement within two or three days on telecommunications amid urgent requests from some provinces to resolve a vacuum created by a landmark Supreme Court of Canada ruling.

A spokesman for the federal Department of Communications said yesterday that a statement will be made either today or early next week. Federal Communications Minister Marcel Masse said Monday he will be "interested" to hear the views of his provincial counterparts on establishing a national telecommunications policy.

"In the absence of any new mechanism or decision from Ottawa, we're operating on the principle that we have to do business as usual," David Colville, director of communications policy at the Nova Scotia Department of Transportation and Communications, said in a telephone interview.

Technically, however, it is now unconstitutional for provincial governments to regulate telephone companies

previously under their jurisdiction, according to the Supreme Court ruling handed down on Monday.

The court found that Ottawa has the sole constitutional jurisdiction to regulate every domestic telephone company, particularly the three provincially owned utilities in the Prairie provinces and the four investor-owned telephone companies in the Maritimes. Alberta Government Telephones began the case more than seven years ago when CNCP Telecommunications of Toronto sought an order from its federal regulator compelling AGT to allow CNCP to hook up to its network.

However, the Supreme Court ruled that federal laws and regulations do not yet apply to AGT because of its provincial Crown immunity. The same finding also applies to Saskatchewan Telecommunications and to the Manitoba Telephone System.

Officials in Alberta have requested urgent meetings with federal officials to discuss how Ottawa will handle the unprecedented situation facing the three Prairie provinces.

Both industry groups and Opposition critics want Ottawa to resolve the legal question independently of deciding how to regulate the industry. "Solving the problem in the Prairies requires a simple amendment to one law, but if they link it to other changes to adopt a national policy, it will take a lot of time and cause a lot of opposition," Don Braden, president of the Association of Competitive Telecommunications Suppliers, said yesterday.

Attempts to build a national policy based on a federal-provincial accord signed in Edmonton in 1987 failed.

Mr Colville announced at a speech in Ottawa earlier this summer that his government repudiates that accord as a basis for an effective policy.

"Having seen what's gone on in the telecommunications industry in the past year, I felt I had to stick my neck out and say that the agreement is now totally unworkable," Mr Colville said this week. He also said the Nova Scotia government has written to Mr Masse requesting an early federal-provincial meeting.

"Our government now believes we need a single regulator that can balance the national interest with regional and business interests."

The Edmonton accord envisaged a two-tiered approach, one for interprovincial and for current federally regulated activities, and one for intra-provincial activities.

Mr Colville also rejects the proposals of several industry groups advocating the creation of a new national body to regulate telecommunications. He said no new body is needed because the Canadian Radio-Television and Telecommunications Commission could be set up with regional commissioners and offices across Canada. "Our

government would live with that and it would not take time to develop new procedures and new appointment mechanisms."

## FEDERAL REPUBLIC OF GERMANY

**Top Private Sector Managers to Head Bundespost**  
55002484 Hamburg DIE WELT in German  
Supplement 10 Aug 89 p 1

[Interview with Federal Minister for Post and Telecommunications Christian Schwarz-Schilling, by Guenther Olthof; date and place of interview not given; first paragraph is DIE WELT introduction: "Schwarz-Schilling: 'My Ministry Is No Boarding School for Girls'"]

[Excerpts] In a few weeks, three top managers from free enterprise will replace Postal Minister Christian Schwarz-Schilling as head of the German Federal Postal Administration. Sought are the very best specialists—idealists who prefer an extraordinary entrepreneurial challenge between the market and monopoly to a lucrative top salary. The expectations on the new management: the three postal enterprises telecommunications [Telekom], Postal Service, and Postal Bank will again be in the black by the mid-1990's at the latest. The three chairmen are supposed to give the approximately 550,000 postal employees a new "we-feeling." The new postal strategy also includes more freedom for the labor force in making decisions. Creativity in the enterprise will be rewarded financially. There are reasonable opportunities for advancement for good people. The unwieldy job pyramid is a thing of the past. In the future, the federal minister for post and telecommunications will ensure fair competition in the entire telecommunications market. Guenther Olthof spoke with Minister Christian Schwarz-Schilling.

**WELT:** Mr Minister, who will be chairman for Telekom, the Postal Service, and the Postal Bank? What kind of stuff are the candidates that you are proposing to the supervisory board made of?

**Schwarz-Schilling:** They will come from free enterprise. The top people of the postal enterprises, which will be among the largest enterprises in the FRG, must above all have the experience to manage large organizations. It is thereby a matter of the following areas in particular: controlling, customer relations, and marketing. It is important to sense developments in the market with the possibility of making rapid adjustments. This can be done only by a flexible enterprise that is not burdened by the fact that every year a budget is imposed that must be adhered to even when the figures in May or June indicate other trends. This, in turn, requires a quite different performance and cost calculation of the enterprise. We in the postal administration still have substantial deficits, because our current personnel representations and the trade union do not want to involve themselves in cost

transparency if they can avoid it, especially when it is done in the form of a comparison. [passage omitted]

**WELT:** In the future, who will be in charge of the postal enterprises: politicians, trade unionists or managers?

**Schwarz-Schilling:** The enterprise strategy will be the task of the board members. And one of the main tasks of a chairman of the board is to integrate the mentality of the market economy and postal tradition and especially to bring about integration in the human area among the members of the board. Consider that if possible the board should be made up about equally of qualified candidates from within and without. In individual cases, the ratio can be 60:40 or 40:60. The same thing is true for the management level below the board, that is, for the business managers. I am convinced that it is precisely at this level where many important decisions must be made. [passage omitted]

**WELT:** Must one expect that the rates for telecommunications or the postal service will be raised very soon?

[Schwarz-Schilling] I do not believe that this will be among the first actions of a board of directors. As for the yellow post office, we reached fundamental decisions in 1988. After the rates for letters and packages were reorganized, I do not expect that the boards of directors will make any additional changes before the end of 1991. In the telephone area, last year we already decided on Tariff 90, which will bring about changes in rates by 1991. That means that on 1 April in both 1990 and 1991 there will be further reductions of the telephone rates in the long-distance area. So the only thing that is conceivable, so to speak, is an "outcry" of the future board of directors for Telekom, which thinks that the rate reductions are too large, something that I do not believe, however. It is my perception that the rate reform that we introduced in 1988 corresponds to that which a future board of directors would consider correct here. But in the future as well, it is not I who will decide but the board of directors. What would it be worth without an independent price policy? [passage omitted]

**WELT:** The post office is supposed to be a strong market partner and challenge the competitors. Do you consider it sensible for Telekom to involve itself in the production of end items?

**Schwarz-Schilling:** That is not foreseen at all. We would then be creating a situation that we had previously with AT&T in the United States. Since Telekom has a monopoly in the network, I would consider its own production of equipment that is hooked up to its own network to be an extremely questionable policy.

**WELT:** In mobile radio, the private companies are getting a chance in addition to the post office. When will you issue the license for the second tenderer?

**Schwarz-Schilling:** Several consortia and individual interests are competing. The last day of the tender is 12 September 1989 or, for certain parts, in October. At that



time, the steering committee team under Prof Erhard Kantzenbach will look over the offers, make an evaluation and give me a recommendation. The decision will be made by 12 December 1989.

**WELT:** Do you think that the mobile radio could be a big business for the investors as it is abroad?

**Schwarz-Schilling** Well, as is so often the case, new things are tackled with a gold-digger mentality. I am convinced that a second, private carrier as a second tenderer can succeed very well if given fair competitive conditions. An approximately equal division of the market is quite conceivable. [passage omitted]

[Boxed material] The reorganization of the German Federal Postal Administration separates entrepreneurial from political-sovereign tasks. In the future, the three new postal enterprises Telekom (DM36.7 billion turnover/197,000 employees), Postal Service (13.9 billion/220,000) and Postal Bank (1.9 billion/39,000) will work under management principles. Telekom in particular must thereby subject itself to the harsh wind of competition. To be sure, it retains the large receipts from the monopoly in the telephone network and telephone service but in many fields it must meet the competition largely unprotected. [passage omitted]

The Federal Ministry for Post and Telecommunications will establish its own department for market regulation (about 140 employees). The Central Office for Licensing in Telecommunications (Saarbruecken) subordinate to the minister takes over the licensing of equipment. A new "Federal Office for Post and Telecommunications" with about 2,000 employees is supposed to be set up for the administration of frequencies and other sovereign tasks.

## FRANCE

### Corrective Measures Planned for 'Hipparcos'

55002483 Paris *LE MONDE* in French 19 Aug 89 p 17

[Article by Ca.V.: "After Unsuccessful New Ignition Test, European Space Agency Studies 'Retrofit Plan' for Hipparcos"]

[Text] Launched on Wednesday, 9 August, by the Ariane rocket, whose apogee engine has since then stubbornly refused to ignite, Hipparcos, the European astronomical satellite, has been dogged by fate. On 17 August European Space Agency (ESA) officials conducted a new test, increasing the number of successive blast-offs from 14 to 80. The fourth attempt, the fourth failure. A fifth test is scheduled for next Tuesday, during which the satellite's axis will be tilted by about 20 percent in the hope that this "shove" will produce favorable results.

Meeting at the ESA's West German Space Operations Center (ESOC) in Darmstadt, mission officials stated on Thursday that they would give themselves 10 days more

to correct the problem. But the chances of seeing Hipparcos reach its operational orbit at an altitude of 36,000 km are getting slim. And ESA officials are now concentrating on a mission "retrofit plan" based on an elliptical orbit.

After running into a transmission problem, followed by a defect in the decoding of computerized data received aboard the satellite (*LE MONDE*, 15 August), the technicians at present suspect that a simple short circuit that occurred in one of the Mage II engine's two fuel lines is at the bottom of this unforeseen breakdown. A possibility that is all the more maddening for the French company, MATRA [Mechanics, Aviation, and Missiles Company], the general contractor for the project, since everything other than this celebrated engine's ignition system appears to be functioning perfectly aboard the satellite. Since it was launched, the latter has received and "understood" over a million remote-control orders and the radio transmission of measurements made at a distance, which permits it to remain in contact with earth, has gone off without a hitch.

"Even if it does not succeed in regaining its geostationary orbit, Hipparcos will be able to complete most of its mission," Wilhelm Brado, assistant director of ESOC, asserted. To be sure, but with a diminished lifespan and a considerable loss of accuracy. Reduced to a rotation speed of 30 revolutions per minute (instead of twice that originally), the satellite is now rotating in an extremely elliptical transfer orbit, the lowpoint (the perigee) of which is 210 km from earth. So, although there is no danger of its falling on our heads, Hipparcos is at an altitude that is much too low to catalogue 120,000 stars, as provided for in its mission.

Even if its perigee is raised by from 400 to 600 km with hydrazine propellants, as ESA officials plan to do, Hipparcos will only be able to observe each star three or four times instead of the originally planned 24. A last-chance plan for which Hipparcos will need a supplementary ground station since its orbit will continue to be elliptical, not circular.

Aside from the main station at Odenwald, Germany, the Australian control center at Perth might thus be equipped with high-speed links in order to receive scientific data transmitted by the "sky surveyor." In order, also, to save what can be saved of a program that has cost the ESA nearly Fr 2.5 billion—and which, as is the case for most scientific satellites, does not benefit from any insurance.

### TDF1 Satellite's Continuing Difficulties

55002488 Paris *LIBERATION* in French  
31 Aug 89 p 10

[Excerpts from an article by Marie-Eve Chamard: "TDF1: Geostationary Damages"; first paragraph is *LIBERATION* introduction]



[Excerpt] Technical and commercial problems are stacking up for the French live-television satellite. Besides the summer breakdown, not yet completely resolved, there is uncertainty about the management of decoders and the operation of channels.

"Does TDF1 have a commercial future, or any future at all...?" Ten months after its inauguration, and a few months after the assignment of its five channels, the nagging question that has dogged every step of the French live-television satellite program has resurfaced this fall with a vengeance—and is causing much worry.

The late-blooming "bouquet" of programs rather hastily put together last April by the CSA [not further expanded]—the channels selected will not begin broadcasting until the spring of 1990—has not put a end to the vicissitudes of TDF's prize possession. The five channels are the following: Canal [Channel] Plus (to duplicate its French program), Canal Plus Germany, Canal Children and Euromusique (the two share the same channel), the sports channel Sports 2 (conceived by A2 and FR3) and, finally, the Sept [Channel 7], featuring cultural and European programming.[passage omitted]

Four months after assigning these channels, then, the picture is less than glorious: individual reception is impossible, negotiations between operators of future channels are difficult, industry people are being challenged, there is a showdown going on with France Telecom, and, as of 1 August, one of its channels has totally broken down. TDF1's "great adventure" costing more than 3 billion francs is starting this fall to look like a sketch worthy of the Branquignols.

It was at the height of summer, while TDF-sponsored discussions between operators were unraveling, that TDF1 tottered on the brink of space disaster. Solar effects, a magnetic storm, the sudden malfunction of a key part? In any event, a massive breakdown. The Sept's screen blacked out. It was cold-sweat time in the TDF1 laboratories. It took over 2 hours for technicians to coax the satellite out of the total silence into which it had plunged. They only partially succeeded, since one of the channels, Channel One, cannot be reactivated despite all their efforts. Ever since, the recalcitrant channel has been, not overoptimistically, poked and probed. The final diagnosis will not be pronounced until mid-October, since, according to specialists, TDF1 has everything to lose from an ill-timed attempt to restore functioning.[passage omitted]

#### **Ariane Successfully Places Two Satellites in Orbit from French Guiana**

PA0908012289 Hamburg DPA in Spanish 0042 GMT  
9 Aug 89

[Text] Kourou, 8 Aug (DPA)—The European Ariane-4 rocket today successfully fulfilled its mission by placing the satellites TV-SAT 2 for television transmissions and Hipparcos for astronomical studies into geostationary orbit.

The Ariane-4 rocket reached its target orbit 18 minutes after liftoff at 2356 GMT from the Kourou Space Center in French Guiana.

It placed the TV-SAT 2 satellite in orbit 2 minutes later and the Hipparcos satellite minutes after that. Thereafter, the German Oberpfaffenhofen Control Center in Bavaria assumed control of TV-SAT 2 and the European ESOC Operations Center in Darmstadt, West Germany, assumed control of the astronomical satellite.

## **ITALY**

### **ITALCABLE Establishes 'Services Center'**

55002479 Milan SISTEMI DI  
TELECOMUNICAZIONI in Italian  
5 May 89 pp 14-23

[Article by Paolo Baldoni, Maurizio Rufini, and Roberto Simeoni, Services Center: "ITALCABLE: Its Services Center Provides Global Response to New International Telecommunications Scenario"]

[Text] The growing and inevitable communications needs expressed by the business community and public bodies have created a reference market for telecommunications and teletronics (telematics) companies marked by strong competition and rapid growth.

Customers, who are generally very expert and often characterized by impressive international presence, want global solutions to their telecommunications problems, which in turn are related to information management and office automation processes.

ITALCABLE's response to this complex and challenging situation is embodied in establishment of the Services Center, whose function it is to engage in technical and commercial defense and promotion of the telematics and advanced telecommunications sector.

Adopting a global approach, the Services Center offers its customers vertical solutions or exhaustive projects based on an array of value-added network services, standard systems made by ITALCABLE itself or by third parties, and ad hoc software applications.

#### **1. The New Telecommunications Scenario**

The rapid social and political transformation and the ongoing technological progress marking our time have generated a number of situations characterized by a significant degree of complexity and interrelationship in comparison to the past.

The telecommunications sector certainly does nothing to reduce this complexity of situations and relationships. The countries involved as a group, the monopoly crises, and the inexorable demands of the market, combined with advances in equipment, are shaping a reference scenario almost symbolic of the modern world.

The process of internationalization of the business community, dictated by the necessity of extending one's own markets to guarantee oneself high rates of development, involves telecommunications companies in particular, which are finding it increasingly difficult to adjust to divisions of territorial jurisdiction and operational authority.

As a matter of fact, while on the one hand globalization of markets leads to the overcoming of geographic and political barriers, on the other, technological development is eliminating the traditional subdivision of basic services, a subdivision that causes each of the services to have a clear-cut infrastructure of its own (network, communications systems, user approach, rate-setting approach, and so forth).

The objective, shared at the world level by telecommunications managers, calls for the creation of a first integrated network level (narrow band ISDN) by the end of 1990. The target will then be a broad band ISDN for multimedia data transmission (voice, text, data, images).

Another decisive phenomenon is the merging of data processing and telecommunications, understood not only as the use of microelectronics and software in the service of transmission and switching techniques but also in terms of telematics or remote data processing. EDP environments and users remote from each other should be able to interact through telecommunications networks in real time, at high to very high speeds and with absolute system reliability.

The telematics and advanced telecommunications market is aimed at customers with highly complex communications requirements, which are as stated below.

#### **Need for Standardization**

Compatibility of different systems and connectivity between geographically and technologically diverse networks would provide the customer with an incomparable guarantee for the investments required for internal automation, in addition to the great number of operating facilities.

#### **Integration and Control of Information Resources**

Another important factor to the customer is the ability to manage public services in a flexible manner, adapting them to his own needs and integrating them into his own in-house processing resources.

This entails user ability to control and regulate the configuration of the services and the products relating to them and to optimize maintenance and costs.

From the manager's viewpoint, this means imparting to the network an intelligence capable of effecting close integration with the processing capabilities of user systems.

#### **Request for Vertical Solutions**

Companies that are on the point of automating or upgrading their remote data-processing systems often prefer to submit their own problems to sector operators capable of offering global solutions such as can optimize the relationship between public and private resources (vertical solutions).

#### **2. The ITALCABLE Position**

In its commitment to deal with the international scenario outlined in the previous section by providing adequate solutions, our company can boast of strong points deriving from its more than 50 years of experience as an intercontinental telecommunications manager.

As such, ITALCABLE has always been faced with disparate situations due to different national choices marked by high complexity and rapid evolution.

The need for interfacing a wide diversity of networks has impelled ITALCABLE to search constantly for the most advanced technological solutions.

In adopting such solutions, however, it has always aimed at simultaneously reaching a high level of independence from suppliers, and an acceptable degree of management cost effectiveness.

This approach to innovation has resulted in a mode of operation sensitive to both technical progress and market requirements.

The fact that the fundamental component of international communications is represented by traffic and applications deriving from business use also contributes to the market oriented aspect of ITALCABLE.

In summary, we may note that, in approaching the telematics and advanced telecommunications sector, our company is afforded significant advantages by factors such as its constant efforts to cope with different national situations, ongoing and renewed need for achieving global connectivity, and actual operation in harmony with market characteristics (technological development, customer requests, cost effectiveness constraints).

#### **3. ITALCABLE'S Offering**

ITALCABLE initiated the international electronic message service IRICON in the mid-1970's.

In addition to its central function of storing and forwarding telex messages, IRICON offered a number of value-added services such as multiaddressing, closed groups, and protocol and rate conversion, which at that time unquestionably represented innovations in Italy.

By expanding IRICON value-added services and launching further initiatives specific to the VAS/VAN (Value-Added Services and Networks) context, ITALCABLE later gradually transformed the IRICON service, understood both as technology and as professional experience, into the fundamental nucleus of a new and organic corporate entity, the Services Center.

The Services Center, through which ITALCABLE acts on the new international telematics and advanced telecommunications market, is a structure made up of a vast complex of modern equipment handled by personnel highly specialized in both the technical and the commercial fields.

This structure enables our company to establish a direct and privileged relationship with the most advanced customers, whom it can offer advanced value-added services, systems and software services, and, last but not least, vertical solutions.

In addition, because of its greater competitiveness and flexibility, the Services Center has been organized and is managed as a business unit, the Services Center Division.

This business unit embodies all the typical functions of a modern company: sales, customer assistance, marketing, and technical development and production (= equipment management and maintenance).

The work of the Services Center is divided into three closely related areas: value-added network services, systems and software products, and projects and vertical solutions.

Figure 1 presents a diagram of our portfolio showing the current relationships between the three areas.

Subsequent sections are devoted to concise description of the three areas in question. More space will be given to recently activated services, M.A.G.I.C. on line and MATRIX interworking between networks.

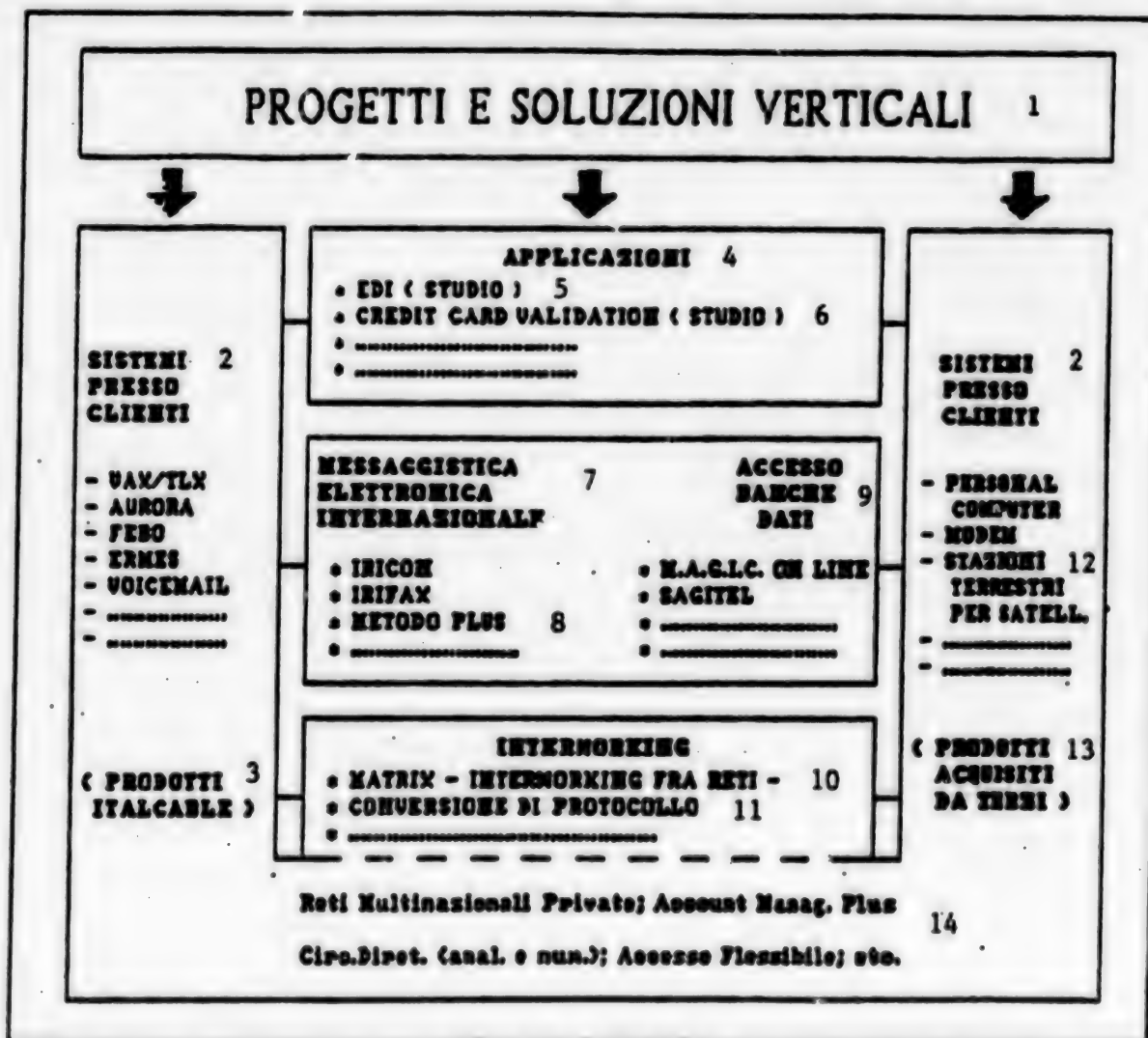


Figure 1. Services Center

Key: 1. Projects and vertical solutions 2. Customer systems 3. (ITALCABLE products) 4. Applications 5. EDI (study) 6. Credit card validation (study) 7. International electronic message service 8. Plus method 9. Data bank access 10. Matrix—interworking between networks 11. Protocol conversion 12. Ground satellite stations 13. (Products purchased from third parties) 14. Multinational private networks; Account Management Plus Direct Circuits (analog and digital); Flexible Access; etc.



#### 4. Network Services

This level includes services closely related to transmission functions.

The Services Center designs and markets multinational private networks through its leased circuit service.

Agreements among the primary managers are in an advanced stage of completion, which will allow the holders of such networks to have a single interface in a single country (Account Management Plus).

Also in the process of being placed on the international market is the Generalized Flexible Access project, which, using a complete system generally made up of a stationary or mobile antenna on the customer's premises and one or more satellite channels, offers direct and privileged access to the ITALCABLE networks and meets all voice, data, and image needs.

This service, which addresses the business user residing abroad, is termed a "generalized access" service because it provides access to all ITALCABLE services (such as the services center, videoconferencing); it is also termed "flexible" because the customer has the option of tailoring use of the connection to the services of which he wants to avail himself.

#### 5. Value-Added Services (VAS)

Integration of value-added services (now offered separately) is currently being implemented at the Services Center.

Integration essentially pursues the aim of achieving uniqueness of contract and invoicing and uniqueness of access.

A single access procedure allows the user to make connection with the Services Center; the service desired is selected through a menu structured mask.

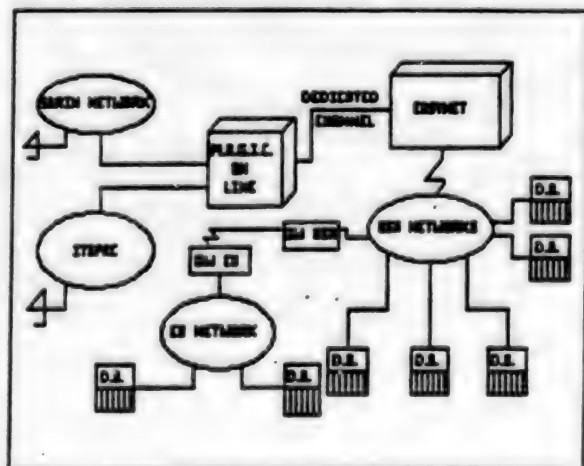


Figure 2. Configuration of M.A.G.I.C. On-Line Network

The customer can obviously avail himself only of the services for which he has applied.

Such unified access is currently implemented at the peripheral level, that is, by means of an appropriate floppy disk supplied to the customer who requests it.

A centralized interface will definitively develop unified access by the end of 1989.

To promote greater ease of understanding for our customers, the VAS currently offered are presented as subdivided into several functional levels (figure 1).

The superimposition of levels does not mean that use of a particular service requires use of the subordinate levels; the purpose of this presentation is simply to visualize the "distance" of each level from the traditional telecommunications services, in the sense that increase in level is accompanied by increase in the applications aspect and decrease in the functional relationship with telecommunications transmission networks.

#### Interworking—Connectivity

Along with the centralized interfaces that effect protocol conversions (3270, 2780), as well as interfacing of different networks and systems, this level contains a service recently activated (in 1989) that definitely represents an innovation for the Italian market, MATRIX interworking between networks, which offers access to the telex network by the telephone and/or PSDN (Packet-Switched Data Network).

Section 9 describes this service in greater detail.

#### International Electronic Message Service

The aim pursued by the Services Center in the area of international electronic message service is to utilize appropriate interfaces and further developments of the current IRICON service to create a unique and exhaustive system/service capable of performing the following macrofunctions: handling of any type of electronic message (telex, teletex, facsimile, voice messages, mailbox); connection to any public network; interworking with private networks and systems by means of ad hoc interfaces ("personalization" of such interfaces—that is, tailoring to the customer's situation, must require routine work only); and compatibility with other electronic message systems, both public and private.

In connection with the last-named point, the Services Center will avail itself predominantly of the MHS/X.400 international gateway, which ITALCABLE will activate in 1989.

As is known, the above acronym alludes to a number of CCITT (International Consultative Committee on Telephony and Telegraphy) recommendations that define the architecture, functions, services, and communications protocols of the so-called message handling systems

(MHS), a designation commonly used today to define electronic message-processing and transfer systems.

The plans also call for ensuring that ITALCABLE's MHS will offer a suitable interface for the IBM electronic message systems (PROFS and DISOSS).

Compatibility with the IBM environment will unquestionably create many important commercial opportunities for ITALCABLE.

The Services Center, which in addition is well on its way to reaching the goal outlined above, currently markets two message services, IRICON and METODO PLUS.

### IRICON

This service affords customers (to the great advantage above all of those with an international presence) the possibility of organizing and using private and automatic telecommunications networks with high performance characteristics (confidentiality, efficiency, high transmission capacity) to exchange data and messages.

The nucleus of IRICON is made up of a power message switchboard to which centralized interfaces have been added over time to perform the following functions:

**SATEL:** transmission of messages to telex stations the system does not recognize as IRICON private network terminals (in other words, SATEL opens up private networks, which in themselves are closed groups, to the entire telex world).

**DIALIN/DIALOUT:** connection of the telephone network to IRICON by use of asynchronous terminals and/or personal computers equipped with suitable line interfaces (modem plus telecommunications software).

**IRIS:** access to IRICON through the packet switching data network; interaction between IRICON and the user takes place through a system of personal electronic mail boxes.

**IRIFAX:** transmission of originally nonfacsimile messages to facsimile devices.

As soon as the interfaces in question effect interconnection among the various public networks, the customer is able to use a large number of devices as terminals recognizable by IRICON: telex stations, asynchronous terminals, personal computers, facsimile devices, and workstations adapted for data transmission.

If economically convenient, the IRICON customer may use dedicated circuits to connect his main offices directly to the centralized system.

An entire series of controls, data, and guarantees provides for traffic center management on behalf of each customer.

**METODO PLUS** (*MultiAccessible Electronic Transfer of Documents*)

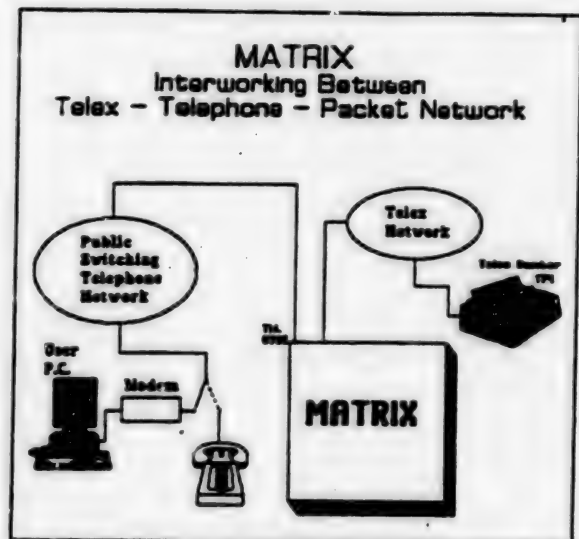


Figure 3. MATRIX: Access to the Service Through the Telephone Network

This is a service that performs electronic transfer of documents, graphics, and photographs in black and white with very high reproduction quality.

**METODO PLUS** offers fax store and forward value-added services such as multiaddressing, deferred delivery, and interconnection with facsimile groups 3 and 4. Marketing of this system is aimed at all facsimile users, and at major international organizations in particular.

### Data Bank Access

**M.A.G.I.C.** on line (see Section 8) allows access, with a single subscription contract and a unique and simple query language, to approximately 1,200 data banks situated chiefly in the United States and managed by foreign suppliers.

To be launched in 1989 is **INFO-Brokers**, which will allow any organization to obtain extemporaneous research from our experts without having to subscribe to any on-line information retrieval service.

In addition, ITALCABLE is getting ready to market data banks it has designed and created, in addition to guided access to computerized information.

The plans call for allowing "public" access in the near future to the **SAGITEL** data base currently available exclusively to ITALCABLE telex operators.

**SAGITEL** contains data on all telex and teletex users throughout the world, including users of the U.S. electronic mail service **EasyLink**.

**SAGITEL** records also provide telex and teletex users with information of commercial interest useful for marketing and sales operations.

MEDIBASE, a medical data base, is also in the definition stage.

#### Applications

Added values aimed at solving specific requirements belong to this level.

For the sake of better understanding of the applications nature of this level, we refer to our studies relating to a possible credit card management telematics service (Credit Card Validation Service).

### 6. SOFTWARE SYSTEMS AND PRODUCTS

Being aware of the importance of software development in the current context of telecommunications and telematics, ITALCABLE has developed within itself an appropriate structure organized on the model of a software house.

The function of marketing the systems produced by this structure has been assigned to the Services Center.

It goes without saying that in this context marketing implies predominantly catalog listing of products within the framework of projects requested by customers.

Our catalog products are divided into two categories, as a function of the area in which automation is carried out: press agency automation (message reception and transmission, message selection and treatment, appropriate data bank for message storage) and telex management automation (the packets in this category allow our customers full automation of telex traffic; if the customer already has an office automation and/or electronic mail system, a suitable and easily set interface effects interworking between such packets and the in-house system).

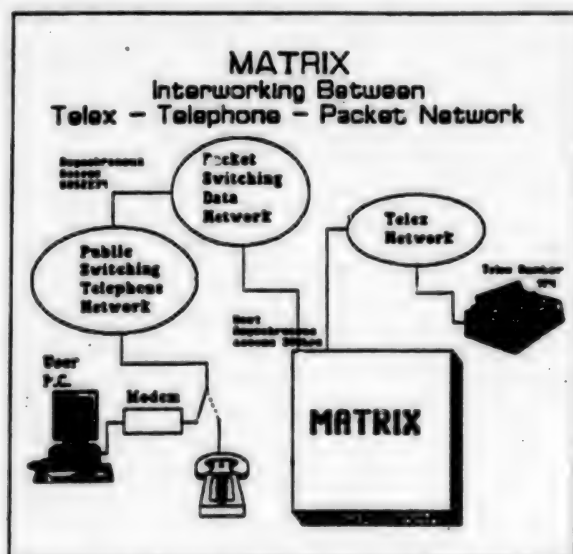


Figure 4. Access to Service Through the Packet Switching Network

Our portfolio also comprises the voicemail systems developed by Voicemail International, Inc., Santa Clara, California, in which ITALCABLE holds stock shares equaling 37 percent.

The voice message service or voice store and forward/retrieval allows the sending and reception of messages by use of electronic mailboxes that can be reached through the standard telephone service.

The use of this technology is especially convenient when the person called (who obviously must have a voicemailbox) cannot be reached directly by telephone, in handling reservations and orders, and for information services.

The voicemail systems provide a wide range of functions (for example, the holder of a box can plan use of the box so that arriving messages are delivered immediately by telephone or teledrin, while normally the holder must make connection to his mailbox to hear messages).

### 7. VERTICAL PROJECTS AND SOLUTIONS

It is to be seen from the picture drawn at the beginning of this article that the Services Center must increasingly polarize its own activities toward planning construed as marketing global "turnkey" solutions to communication problems submitted by customers.

To demonstrate the scope and diversification of the project field in which our division can and should be active, we will give a brief description of some of our work.

The Services Center has designed and built a 64-kilobyte satellite data transmission network for a customer with plants in Milan, Malta, and France. The project consisted specifically of supplying, installing, and operating an antenna system situated in Malta.

A complete electronic message service project has been carried out for a Milan customer with main office in New York. Our experts met the customer's requirements by designing and optimizing a combination of elements: ad hoc telecommunications software developed at ITALCABLE and installed at the customer's Milan office, MATRIX interworking service between networks, an ITAPAC network, and ITALMAIL service (an electronic mail service of the Telemail type operated by ITALCABLE USA).

### 8. M.A.G.I.C. ON LINE

The introduction of the M.A.G.I.C. on-line service to the Italian market at the beginning of November 1987 represented a significant step for Italy in the information retrieval sector, in that it offers a methodology of data bank access (with subsequent retrieval of information and data) that is simple to use but advanced because of its information potential.



The system that M.A.G.I.C. on line embodies was developed in the United States and consists, from the functional viewpoint, of a unique and intelligent interface linking users of information on one side to a total of approximately 1,200 data banks on the other, residing mostly in the United States and managed by 13 different information providers or data base vendors (see figure 2, Network Configuration).

The system displays its "intelligence" chiefly in its ability to select the data bank most in keeping with the information needs expressed by the user, and in its ability to retrieve requested data independently.

Whoever gains access to M.A.G.I.C. on line can search for information by one of the following methods:

1. direct indication of the data bank concerned to the service, resulting in reduction of time and cost;
2. assignment of the selection operation to the service.

In the first instance, the user can avail himself of the directory on-line service, consulting the terminal itself for a list of available data banks, and, in the second, the system proceeds to single out the optimum data bank through a series of appropriate menus, at each of which the user is to indicate his choice.

The unique features of the interface are represented by the interaction with hosts, the commercial aspects (contract, rates, and invoicing), and the query language.

The M.A.G.I.C. on-line information resources cover more than 100 research subjects.

A user who encounters difficulty in the course of research can establish contact with a specialist operator through an appropriate command. All the questions in the matter can be directed to this operator by keying them in at the keyboard in Italian (SOS function).

M.A.G.I.C. on line is scheduled to evolve into a distributed data-processing key; an international network of intelligent nodes will be developed, which is similar to the system on which the current service is based.

The fundamental aim of this project is to optimize the search sessions in terms of time and cost by distributing the "intelligence," and by using efficient geographic allocation of information nodes and resources.

## 9. MATRIX INTERWORKING BETWEEN NETWORKS

The MATRIX user can employ a personal computer (IBM or compatible) to exchange messages with any telex user.

Access to the service is gained through the public packet switching network and/or the standard telephone network. If the telephone network alone is used (see figure 3), dialing a simple telephone number effects direct connection to the Services Center. In the case of the packet switching network (see figure 4), the generalized

NUI operation permits nonsubscribers to this network to also access ITAPAC (ITAPAC costs are subsequently debited to ITALCABLE).

The connection procedure is always automatic, regardless of the network utilized, in that it is carried out by an appropriate software application on a floppy disk.

The MATRIX user receives a floppy disk containing the MATRIX application, which automates all the connection and switching procedures allowed by the service. Examples of some of the automated features are creation of distribution lists for sending the same message to a maximum of 64 different destinations, processing of messages to be sent and of those received through simple editing functions, reception of confirmations of delivery, scheduling the sending of a message at a predetermined date and time, and archive creation and management.

Reception of messages is at the discretion of the user, who can send the "not ready to receive" signal to the system maintaining the service, or, if appropriate, the "ready to receive" signal.

MATRIX interworking between networks has been developed by ITALCABLE out of special consideration for the needs of users who do not find fixed telex costs to be justified because of low telex volume, those who find the operating and personnel costs involved in dedicated asynchronous terminals to be too high, and those who want to upgrade message interchange by means of automatic procedures.

The market for MATRIX interworking between networks will expand in terms of segments because of the short-term and medium-term upgrades scheduled.

## ISDN as Described in CCITT 'Blue Book'

55002477 Milan *SISTEMI DI TELECOMUNICAZIONI* in Italian 5 May 89 pp 24-34

[Article by Roberto Giovannini, Marketing Area Manager, SIXTEL (Olivetti Group), Milan: "ISDN: Architecture and Recommendations"]

[Text]

## 1. Telecommunications Environment of 1990's

The coming decade will be characterized by a sizable expansion of telecommunications services. The multiplicity and diffusion of those services will depend on the evolution of the technologies involved and on the commitment of many equipment manufacturers.

This scenario has led the top world telecommunications organizations to seek a standardization of services, protocols, and ways and means of accessing new communications networks, able of adequately supporting this growth. In part, the CCITT (International Telegraph and Telecommunications Consultative Committee) has defined a general architecture for the ISDN, and interfaces for accessing that network.

## 2. Introduction to the ISDN

ISDN is an acronym for Integrated Services Digital Network [often translated in Italian and other West European languages into the acronym RNIS]. As defined by the CCITT, it consists of a network in which connections established by digital switching circuits and used for the transmission of digital signals from user to user, via a limited set of interfaces, facilitate the provision of a sufficiently broad range of functions, capabilities, and services to satisfy the market needs of the coming decades.

The defining of standards in this domain results in advantages to the user, which are easily listed:

- It enables the user to pursue a well-defined evolution of products;
- It enables the providing of general-purpose circuits capable of serving several terminals;
- A single connection can be used to provide diverse services: facsimile, voice, data, electronic mail, videotex, etc.;
- It offers portability of terminals made by different manufacturers.

All of this is diagramed schematically in Figure 1.

## 3. CCITT-Defined ISDN Architecture

The ISDN architecture defined by the CCITT includes all the functional units and interfaces required for:

Network services; Network protocols; Network management; Interactive operation among several networks.

All the key blocks comprising this architecture are fully defined in the CCITT "Blue Book," thus concluding a 4-year 1984-88 study.

A conceptual diagram of the architecture is shown in Figure 2. Two zones are indicated: One relates to the user, the other to the public digital network or, more specifically, to the ISDN. The latter will consist of ISDN nodes capable of handling the data streams, including packetized data, and of interfacing the X.25 public network (ITAPAC).

The ISDN nodes will talk with each other via protocols with S7 common-channel signaling (CCS7) on high-bit-rate digital lines. Two modes of access to the ISDN node are available to the user: the "basic" mode at slow speed (144 Kbits/sec) and the "primary" mode at high speed (2,048 Mbits/sec). Both modes, however, will use the same transmission protocol, Q.931. The same protocol can be used between ISPBX's [Integrated Services Private Branch Exchange(s)], between ISPBX and computer or LAN [Local Area Network], and between ISPBX and drops.

## 4. Basic Access, Primary Access, and Reference Points

In this paragraph we shall deal with ISDN terminology in greater detail. Let us consider a simple connection between an ISDN node and a user (Figure 3). We see three interfaces and two network terminations. Interface, or reference point, S is the one through which an ISDN terminal is connected to its "borchia." The latter is designated NT2, for Network Termination Type 2, and is located on the user's premises (we can consider it almost the evolution of the present SIP [Italian State-Owned Telephone Co.] telephone connector). The user circuit (Interface U) from the ISDN exchange, or node, is connected to a Type 1 Network Termination. This termination delimits the network, according to the CCITT-defined architecture. The actual boundary of the network is defined by reference point, or interface, T.

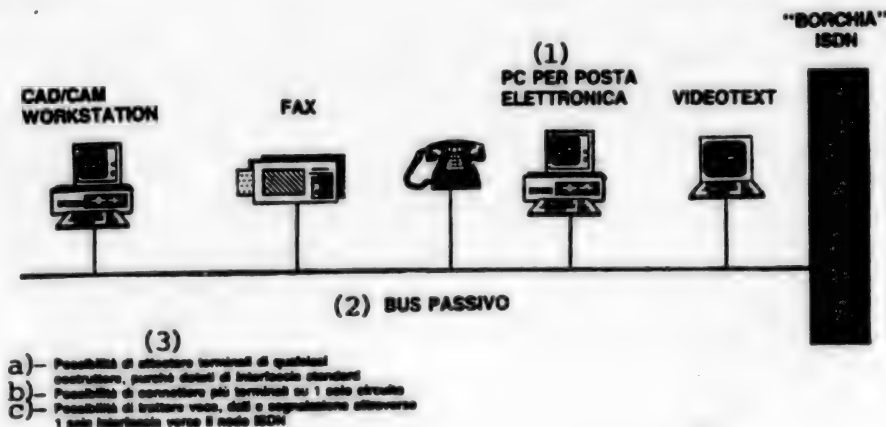


Figure 1. New Capabilities ISDN Will Offer to Users

Key: 1. Personal computer for electronic mail 2. Passive bus 3. Notes: a. Any manufacturer's terminals may be connected, provided they are equipped with standard interface ["portability"] b. Several terminals may be connected to a single circuit c. Voice, data, and signaling can all be handled via a single interface to the ISDN node

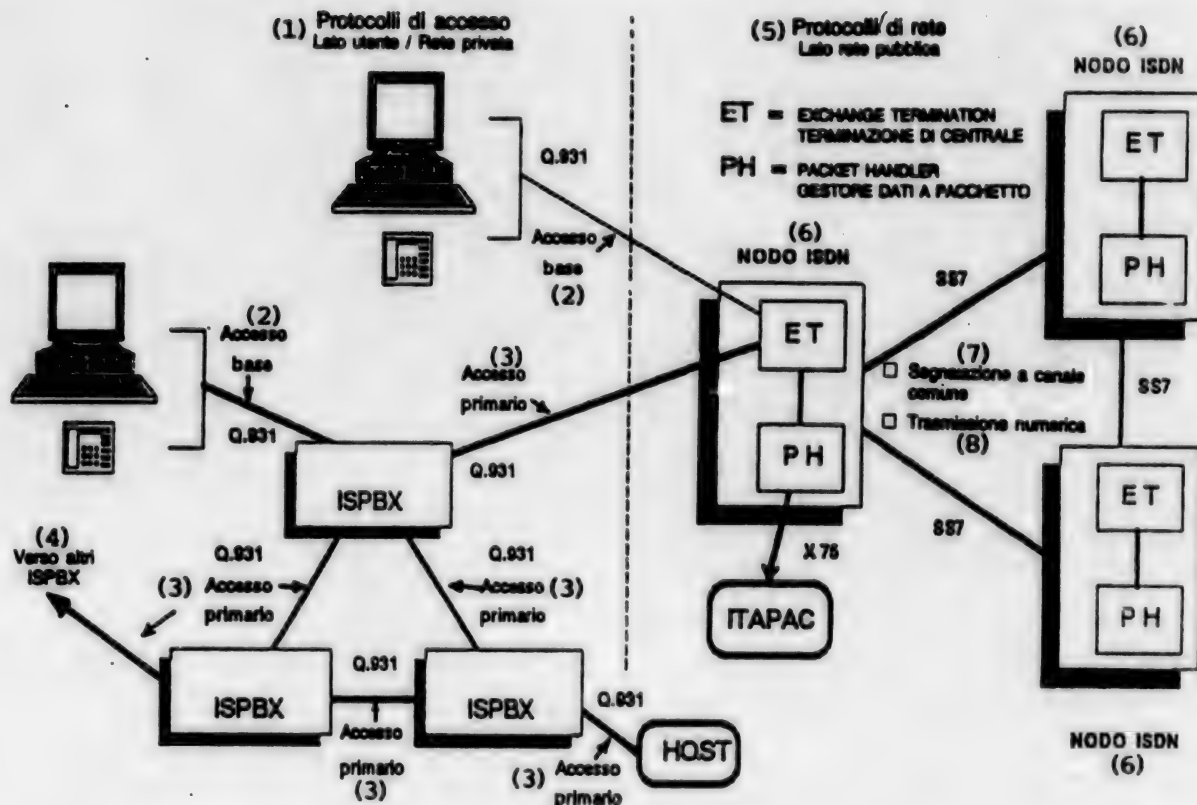


Figure 2. CCITT-Defined ISDN Architecture

Key: 1. Access protocols—User side/Private network 2. Basic access 3. Primary access 4. To other ISPBX's 5. Network protocols—Public switched network side 6. ISDN node 7. Common-channel signaling 8. Digital transmission

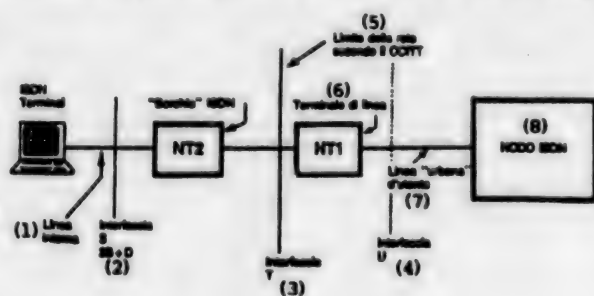


Figure 3. ISDN "User Connection"

Key: 1. Inside line [user premises] 2. S Interface 3. T Interface 4. U Interface 5. CCITT-defined network boundary 6. Line terminal 7. "Urban" user line 8. ISDN node

Let us now take the case (Figure 4) in which the user is, for example, of the "business" type and has a PABX [Private Automatic Branch Exchange] or, better yet, an ISPBX [Integrated Services Private Branch Exchange]. From the standpoint of architecture, nothing changes. The only difference is that the terminal equipments or facilities between which the connection is made are a

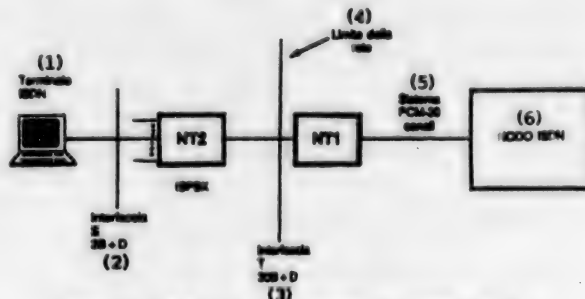


Figure 4. Line From ISPBX to ISDN Node

Key: 1. ISDN terminal 2. S Interface 3. T Interface 4. Network boundary 5. 30-channel PCM system 6. ISDN node

PABX instead of a "borchia," and a 2-Mbits/sec PCM CHANNEL instead of a single digital user circuit.

We conclude this simplified description with a mention that telephone and telematics terminals currently in use—which are non-ISDN-standard—will also be able to be connected to an ISDN user-circuit through suitable adapters, and that the "borchia" will enable operation of a bus to which several terminals can be connected.



## 5. ISO-OSI Model for ISDN

The foregoing discussion describes intuitively and, it is hoped, in a sufficiently simplified manner the principal concepts of the ISDN architecture. We would like now to describe this architecture from the standpoint of the general ISO-OSI [International Standards Organization—Open Systems Interconnection] reference model.

The OSI, which has been adopted by both the ISO and the CCITT as a reference model, subdivides the communications process into several stages. Specifically, it defines seven levels, or layers, each of which incorporates a group of logical functions (Figure 5). The three lower levels describe all the necessary service functions in a communications network, e.g., type of signals interchanged between communicating systems, routing instructions, section protocols, etc. They are distinct from the four upper levels, which instead include all the functions related to "conversation" between the network users, e.g., procedures for setting up a communications session, syntax to be used, format of files to be transmitted, etc. This subdivision is justified logically by the fact that, typically, a network, using the service protocols of the lower levels, puts a user in communication with a distant-end system that is capable of offering him a given application by way of the higher-level functions.

The OSI application model applied to the ISDN is slightly more complex than the general one, in that it is subdivided into two logic-processing parts: a control part

	(1) Modello ISO-OSI di riferimento	(2) Alcune raccomandazioni relative a protocolli
Livello 7	APPLICAZIONE	X.400 EM
Livello 6	PRESENTAZIONE	X.409 SINTASSI
Livello 5	SESSIONE	X.225
Livello 4	TRASPORTO	X.224
Livello 3	RETE	X.25
Livello 2	COLLEGAMENTO	X.25 LAP-B
Livello 1	FISICO	V.24 V.35 X.21

Figure 5. ISO-OSI Reference Model and Examples of CCITT Recommendations

Key: 1. ISO-OSI reference model. Seven layers: 1) Physical level; 2) Data link level; 3) Network level; 4) Transport level; 5) Session level; 6) Presentation level; 7) Application level. 2. Some recommendations relative to protocols. [Legend: LAP = Link access protocol; Sintassi = Syntax; EM = Electronic mail]

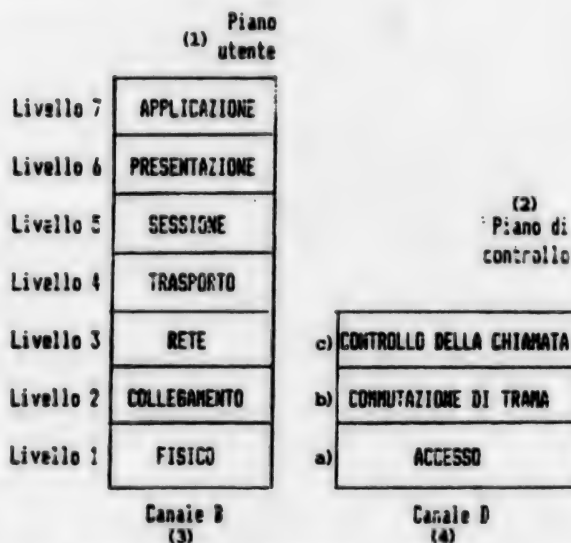


Figure 6. ISO-OSI Reference Model for ISDN

Key: 1. User part. Seven layers: 1) Physical level; 2) Data link level; 3) Network level; 4) Transport level; 5) Session level; 6) Presentation level; 7) Application level. 2. Control part. a) Access. b) Section switching. c) Call control. 3. Channel B 4. Channel D

and a user part (Figure 6). The control part processes the signaling information needed to set up or knock down a link and to provide the supplementary services (e.g., transfer). The user part concerns itself with the user information (voice and/or data), which can be transmitted in the transparent mode or processed by the network. The second of these, for example, takes place with the X.25 protocol in the data-input case. User-part protocols can actually be based on a number of different standards, including trademarked ones as well.

During the period 1984-88, the CCITT developed the standards relative to control-part protocols (Figure 7).

(3) Livello 3	0.930 / 1.450 0.931 / 1.451
(2) Livello 2	0.920 / 1.440 0.921 / 1.441 c) PROTOCOLLO D'ACCESSO ALLA CONNESSIONE D (LAP-D)
(1) Livello 1	a) 1.430 ACCESSO BASE b) 1.431 ACCESSO PRIMARIO

Figure 7. ISO-OSI ISDN Protocols

Key: 1. Level 1: a) Basic access. b) Primary access. 2. Level 2: c) Channel D connection access protocol (LAP-D). 3. Level 3

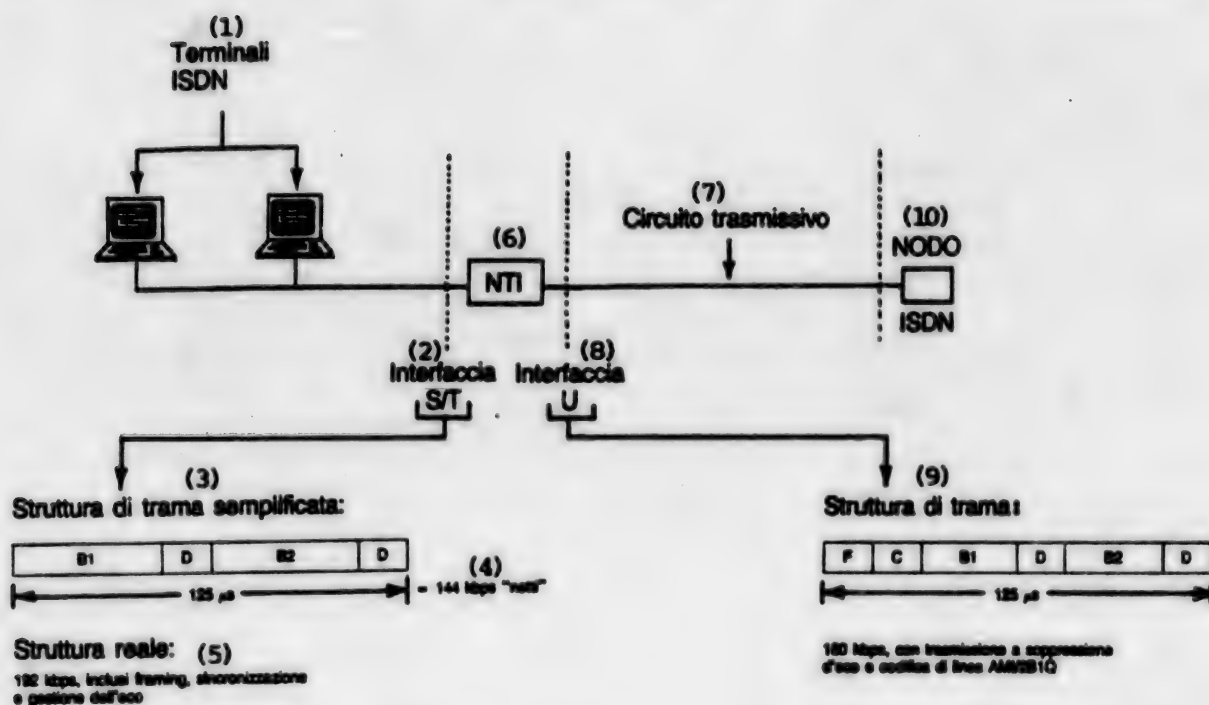


Figure 8. Structure of Physical Level Protocols

Key: 1. ISDN terminals 2. S/T Interface 3. Simplified section structure 4. 144 Kbits/sec "net" 5. Real structure: 192 Kbits/sec, including framing, synchronization, and echo control 6. Type 1 Network Termination 7. Transmission circuit 8. U Interface 9. Section structure: 160 Kbits/sec, with echo-suppressed transmission and AMI/2B1Q line coding. 10. ISDN node

Basically, these protocols define user access to the network, but they have been designed so that they can be used also for signaling between ISPBX's (specifically in the case of protocol Q.931). For signaling between ISDN nodes (public network digital exchanges), the CCITT has defined the aforementioned common-channel signaling system number 7, or CCS7.

Let us consider the case of a digital user-line in which a bus, to which two ISDN terminals are abutted (Figure 8), is itself connected to a Network Termination Type 1 [NT1]. The figure shows the structure of the basic access protocol at the physical level. The data stream between the terminals and the network termination consists of 192 Kbits/sec: 48 of these represent service data (e.g., synchronization, equalization, etc.), while 144 are generated by two B channels at 64 Kbits/sec each, and a D channel at 16 Kbits/sec. Figure 8 also shows the structure of the transmission protocol on the user-line between an ISDN node and a network termination. In this case, control and line maintenance functions require the adding of 16 Kbits/sec to the two B channels and the D channel. Thus, the data stream traversing Interface U for basic type access totals 160 Kbits/sec.

For Level 2, the protocol defined by the CCITT is LAP-D, for Link Access Procedure via Channel D. This

protocol enables the activating, maintaining, and deactivating of a connection—that is, a transfer of data structured in accordance with the Level 1 protocol. It also enables identification of the terminals through a terminal identification field, and provides error detection and correction during the transmission.

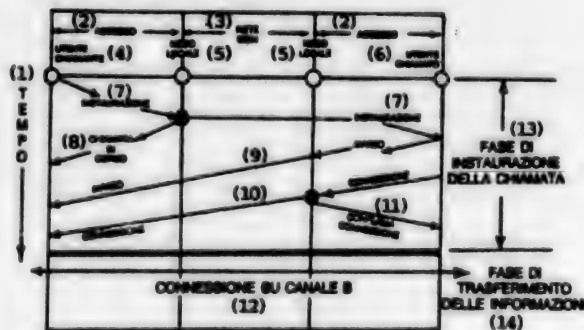


Figure 9. Control of a Basic Call

Key: 1. Time 2. Access 3. ISDN network 4. Calling party 5. Local node 6. Called party 7. Establishment of call 8. Call proceeding 9. Acknowledgement 10. Connect 11. Connect confirmation 12. Connection via Channel B 13. Call establishment phase 14. Information transfer phase

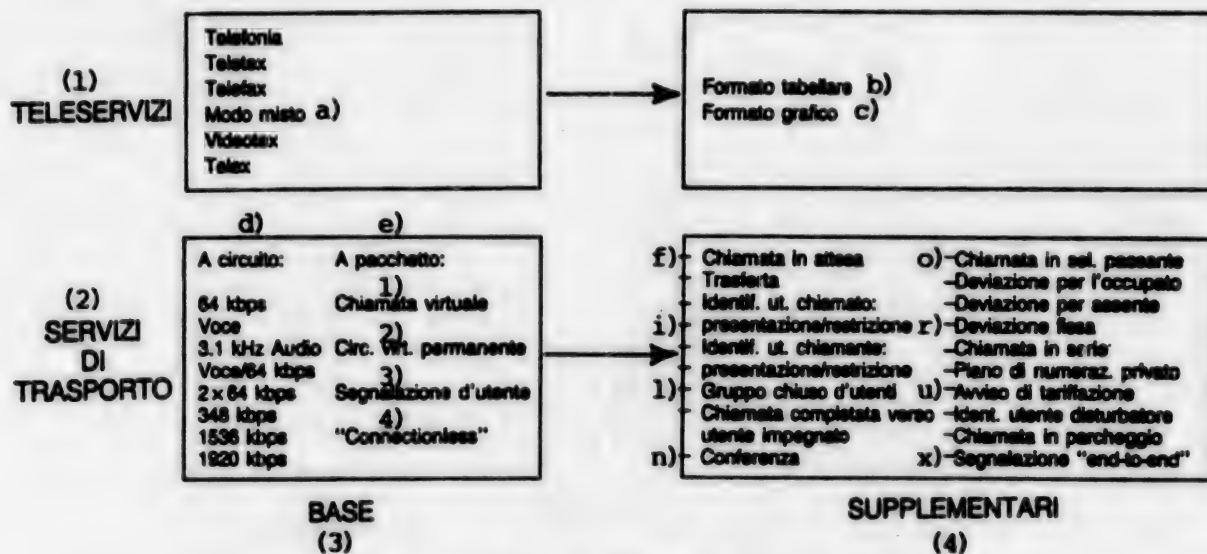


Figure 10. ISDN Services

Key: 1. Basic Teleservices a. Mixed services mode b. Tabular format c. Graphics format 2. Basic Transport Services d. Circuit: e. Packet switching 1) Virtual call 2) Permanent virtual circuit 3) User signaling 4) "Connectionless" 3. Basic Services 4. Supplementary Services f. Call waiting g. Transfer h. Called party identification: i. Presentation/restriction j. Calling party identification: k. Presentation/restriction l. Closed user group m. Booked subscriber call completed n. Conference o. Through-dialing p. Busy-station call forwarding q. Don't-answer call forwarding r. Permanent call forwarding s. Call queuing t. Private numbering plan u. Call charge notification v. Interfering user identification w. Call hold x. End-to-end signaling

An example of establishing a call between two networked ISDN users (Level 3 procedure) is diagrammed in Figure 9. It distinguishes between two fundamental phases—establishment of the connection and transfer of the information—associated with the two channels assigned to them, namely, channel D and one channel B, respectively.

As for the upper levels of the reference model, no protocol has been completely defined for them as yet. On the other hand, some ISDN services have been identified and subdivided into two main categories: Transport Services and Teleservices. Each of these two groups, in turn, includes Basic Services and Supplementary Services. Transport Services—circuit-switched, packet-switched, or nonswitched—include all the functions—transmission, signaling, etc.—pertaining to the first three levels of the OSI model, while Teleservices include the features that directly involve the end-user—e.g., telex, telephony, videotex, etc. A summary table is diagrammed in Figure 10.

#### 6. Present Status of CCITT Recommendations

The CCITT Blue Book concludes the 1984-88 study period. Synoptically, it may be said that:

- Basic access interface 2B+D has been defined: Recommendation I.420;

- The primary access interface has been defined in its two versions: namely, 30B+D (European) and 23B+D (U.S.): Recommendation I.421;
- The network protocol (Level 3) has been defined to include applications between ISPBX's: Recommendation Q.931;
- No standard exists as yet for Interface U.

At present, therefore, ISDN links could be provided between ISPBX's and between ISPBX's and public network exchanges. In both cases, even though the necessary standards (I.421) have been fully defined, uncertainty remains as to which generalized digital transmission system capabilities and which ISDN node services the various national telecommunications administrations are currently prepared to make available. Furthermore, the risk remains high as regards premature basic access realizations, given that Interface U has not been standardized and a European recommendation (NET3) that would enable the production of fully "portable" ISDN terminals is not yet available. The possibility is considered good, however, that the protocol for user-network access in a NET3 environment will be fully defined during the year 1990, and that by 1992 the European standards relative to mobile radio and private telecommunications services will have begun to be firmed up. A widespread diffusion of ISDN terminals and services will thus in all likelihood be under way toward the final years of the 1990's.



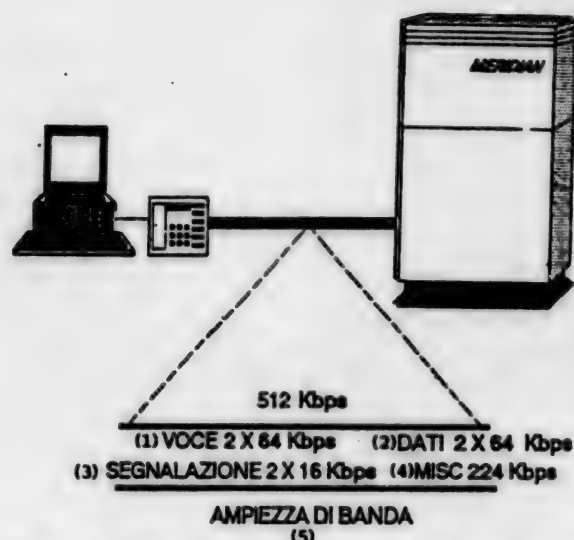


Figure 11. Digital Telephones With Voice/Data Integration  
Key: 1. Voice 2. Data 3. Signaling 4. Miscellaneous 5. Bandwidth

#### 7. Olivetti's Current MERIDIAN Proposal

As of now, Olivetti is already providing ISDN-type capabilities to users of MERIDIAN systems.

Digital telephone sets, for example, offer two 64-Kbits/sec channels and an associated 16-Kbits/sec signaling channel (Figure 11). The interface toward the ISPBX is structured as follows:

- 1) Single-pair (2-wire) link with a maximum span of 1200 meters;
- 2) Two 64-Kbits/sec full-duplex channels usable for voice and/or data;
- 3) One 16 Kbits/sec signaling channel enabling establishment of the basic call and other supplementary capabilities such as conference, call-forwarding, recall, call-transfer, etc., services;
- 4) TCM [time-compression multiplex] transmission technique on 512-Kbits/sec total-bandwidth channel structured as follows:

Voice	64 Kbits/sec x 2	=	128 Kbits/sec
Data	64 Kbits/sec x 2	=	128 Kbits/sec
Signaling	16Kbits/sec x 2	=	32 Kbits/sec
Framing		=	80 Kbits/sec
Pending		=	144 Kbits/sec
TOTAL		=	512 Kbits/sec

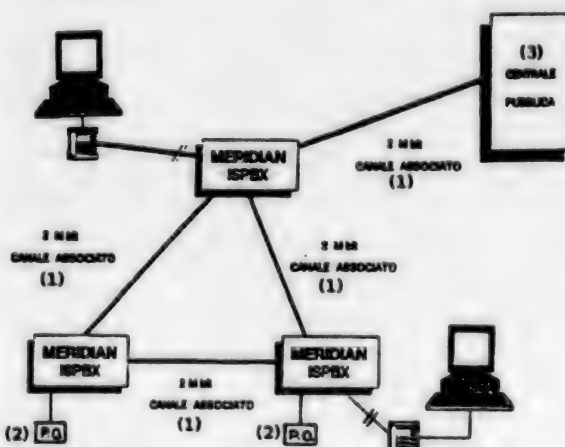
The integrated services line card (ISDLC), whose modularity is eight user connection points, provides the system interface to digital telephones. It is very similar to the ISDN basic interface, in that it provides two 64-Kbits/sec information channels controlled by a separate

signaling channel. The distance that can be spanned by the link and the functional features offered to the user are substantially equivalent to those planned for the final ISDN phase.

MERIDIAN is also provided with a 2-Mbits/sec digital line interface (DTI) conforming to CCITT Recommendation G.703, which enables the operation of 30 PCM [pulse-code-modulated] 64-Kbits/sec voice/data channels. A few variations have been incorporated into the DTI to provide a 64-Kbits/sec common signaling channel, using line codings and standard CCITT section formats to realize a 30 B + D structure, with Protocol Q.931 LAP-D (see above). This interface was submitted to the CEBIT at Hannover last year, and its commercialization is imminent.

As regards network capabilities, MERIDIAN already provides services analogous to those planned for an ISDN environment. Some examples are: calling party identification, call transfer, conference, call waiting, sharing of operator positions, and many others. At present, LI-MFC, the pre-ISDN CEPT standard, is the intermodal switching protocol. With the introduction of the Q.931 protocol, services will be provided in accordance with the most recent CCITT standards.

Figure 12 schematizes the present networking capability with MERIDIAN systems. The general architecture of the links can be seen to be entirely analogous to that of the ISDN (see Figure 2). It can also be seen that the private network is totally transparent to voice/data communications. The MERIDIAN system is called an ISPBX because, conforming as it does to the SIP definition, it can provide telecommunications services to its users that are based on CCITT Recommendations relative to the ISDN.



Key:  
0-10-Far to the Left  
10-20-Left  
20-40-Leans to Left  
40-60-Neither Left nor Right  
60-80-Leans to Right  
80-90-Right  
90-100-Far Right

For all practical purposes, the MERIDIAN investment guarantees the availability of such services through one single system: today according to CEPT standards, and in the near future according to CCITT standards.

#### 8. Conclusions

Olivetti proposed a digital architecture for PABX's as far back as the 1970's, and, since then, has continued evolving its networking products and services. Timeliness and reliability in the making available of technological innovations are characteristics attested to by the largest number of digital PABX's installed in our country to date. These will continue in the near future with the introduction in Italy of the first ISPBX's fully conforming to the CCITT "Blue Book's" 1988 ISDN standards.

#### Director of Radioelectric Services on Maritime Communications

55002475 Rome POSTE E TELECOMUNICAZIONI  
in *Italian Mar/Apr 89* pp 8-16

[Interview with Dr Ivo Tormenta by Luciano Burburan: "Central Management of Radioelectric Services"; date and place not given]

[Excerpts] Running the public and private radio and television system properly; frequency allocation plan; maritime radio service, particularly as regards safety of human lives at sea; satellite transmissions; airwaves abuse monitoring operations; activities in space; system of agreements with RAI [Italian Broadcasting Corp.], Telespazio, etc. These are the main points touched on during the interview with Dr Ivo Tormenta, in the course of which the various aspects of the individual questions were explored in depth, and light was cast upon the activities of the ministry, emphasizing the improvement of services for both public and private users. [passage omitted]

**Tormenta:** The best thing would be to begin by immediately stressing some specific points so as to better orient the reader. For greater clarity, I think it would be useful to start with the organizational chart, as it were. Let me say that the Central Directorate of Radioelectric Services handles the direct operation of some radio communications services and all of the steps pertaining to the licensing of some of these services to third parties.

One thing that is highly significant has to do with the activity of managing the radio frequencies, and that is expressed through the vast number of steps required—from the drafting of the general plans for the utilization of the various frequency bands for the different services by the various managers all the way to the preparation of special plans involving the allocation of frequencies to the individual stations; from the drafting of technical standards to a constant technical coordination and monitoring activity that goes beyond the borders of the nation, especially as regards interaction with neighboring countries.

The radio communications service that the Postal and Telecommunications Administration manages directly and that is part of the activity of the Central Directorate has to do with public correspondence, via radio, with ships, as well as with the safety of human lives at sea.

**POSTE E TELECOMUNICAZIONI:** It seems to me that this is a very important and useful activity, although it is not sufficiently known. I do know that your attention is focused on this sector. What are you doing to improve it?

**Tormenta:** We have made major progress in recent years in the maritime radio service sector, both from the viewpoint of quality involved in putting the links together and through the replacement of now obsolete equipment with other units of more modern design, as well as by increasing the capacity of the facilities through a major increase in the traffic channels to be made available to the users.

This renewal has involved all radio stations and all services performed by them, but some of them were boosted particularly in response to special requests from the users, and they were therefore earmarked to be used much more in the very near future. Among them, we are going to renew the VHF radio-telephone service (at short and medium distances from the coast). This type of service is employed by all of the maritime users and, in particular, by those users who do not have medium-wave or short-wave equipment on board, such as the pleasure craft operators.

Looking at the renewal and capacity boosting program that has been in progress for some years now, we particularly want to recall some innovations or, better still, some achievements that contributed considerably to the transformation and modernization of the maritime radio service.

I am talking here particularly about a new system that enables craft equipped with VHF radios to make direct calls in the ship-to-shore direction for the user to be contacted, just like any other telephone on land.

This system has been activated at the radio postal and telegraph stations of Ancona, Augusta, Bari, Civitavecchia, Livorno, Mazara, Palermo, Porto Cervo, Porto Torres, and Trieste. After that it will be extended to all of the postal-telegraph radio stations.

Besides, by the end of the year the Rome postal-telegraph radio station will have a new computerized system in operation that will not only enable craft to contact any telex user anywhere in the world, as if they were on land, but also offer them an entire series of services, such as message filing, in case the user who is being called happens to be momentarily busy, plus the possibility of automatically interrogating the system to find out whether there is any pending traffic.

**POSTE E TELECOMUNICAZIONI:** Let us now move on to the organizational setup of the service on land.

**Tormenta:** To handle the maritime radio service, the Postal and Telecommunications Administration has 21 coastal stations along the Italian coasts, in places suitably chosen from the geographic viewpoint, so as to cover all of the world's oceans.

The connections are made on the frequencies of the various ranges according to the length of the radio link (HF, MF, and VHF, respectively, for long, medium, and short distances), as well as by using the satellites in stationary earth orbits over the Atlantic Ocean, belonging to the INMARSAT network, through the Rome-Fucino satellite ground station, which has been operational since February 1985.

This network of coastal stations annually handles an average traffic volume of about 221,000 radio telegrams, 700,000 radio telephone calls, and 166,000 radio-telex connections.

In addition to the public correspondence service, the coastal stations handle telecommunications services for navigation assistance and rescue at sea for the Merchant Marine Ministry. The network of coastal radio stations, which the PT [Postal-Telegraph] Administration makes available to the Merchant Marine Ministry, is the same that the Administration itself has for the public correspondence service.

These stations provide their service by continually monitoring the international aid frequencies at 500 KHz for radio telegraphy and 2,182 KHz and 156.8 MHz for radio telephony.

**POSTE E TELECOMUNICAZIONI:** What are the other services that are performed by the coastal stations?

**Tormenta:** Still looking at navigation safety, the coastal radio stations perform the following services:

- urgent notices to navigators;
- squall and storm warnings;
- METEOMAR bulletins pertaining to the weather service;
- medical assistance by radio for maritime vessels through the International Medical Radio Center;
- receiving and transmitting to the Central Inspectorate for Defense of the Sea, attached to the Merchant Marine Ministry, ARES data pertaining to information concerning the navigation plan of the ships.

All of the above-mentioned services are performed with the cooperation of the Navy Staff, the Telecommunications and Flight Assistance Inspectorate, the Air Force, and the Merchant Marine Ministry.

The organization of these services is governed by the standards agreed upon by the interested agencies and those established in the Regulation of Radio Communications as well as by the International Convention of Rescue at Sea.

**POSTE E TELECOMUNICAZIONI:** But the show-piece, of course, is the satellite service.

**Tormenta:** Certainly. As for the maritime radio service via satellite, the Italian Postal and Telegraph Administration, together with the Telespazio Co., built a coastal ground station, which, through the INMARSAT System, makes it possible to link up with ships located in the Atlantic region (including the Mediterranean Sea), and both domestic and international telephone and telex users ashore.

The operations center of this station is located at the receiving section of the Rome Radio Postal and Telegraph Facility, while the radio-frequency systems are located in Fucino and use the installations of the Telespazio Co., which is a concessionaire of the PT Ministry.

To handle radio links via INMARSAT satellite to ships sailing in other oceanic regions (Indian and Pacific), the PT Administration is routing domestic shore-to-ship traffic, both telephone and telex, through the ground coastal stations of Termopili (Greece), St. Paul (United States), and Ibaraki (Japan).

**POSTE E TELECOMUNICAZIONI:** The INMARSAT System will go into high gear in the near future. Tell us how.

**Tormenta:** The INMARSAT System will play a decisive role in the future global sea rescue and safety system that will be introduced at the beginning of the 1990's. This system will integrate and coordinate the use of each satellite with traditional radio techniques, decisively improving the radio services dedicated to navigation safety, particularly those having to do with rescue, search in case of disasters at sea, and preventive actions.

One INMARSAT program the PT Administration is following with great interest has to do with the establishment and activation—along with the maritime service—of the aeronautical service via satellite, in addition to making it possible to improve service and safety communications for aircraft in flight. This system will make it possible to provide travelers with a particularly efficient commercial service.

**POSTE E TELECOMUNICAZIONI:** You are also doing much work regarding the monitoring of radio electric emissions to prevent dangerous field invasions and dangerous disturbances and interference.

**Tormenta:** This is one aspect we are very much concerned with. The Administration devotes particular attention to the activity of managing the radio electric spectrum, especially as regards the correct employment of the spectrum by the users. This is done for the purpose of checking to make sure that the frequencies used are in accordance with the allocation tables of the National Plan for the Distribution of Radio Frequencies and the International Regulation on Radio Communications.



The monitoring tasks also include the job of identifying sources of interference and disturbance as well as any possible abusive utilization.

This complex radio electric spectrum management activity is expressed in various phases that extend from the allocation of frequency bands to the frequency assignment services for the individual stations, to the issue and implementation of standards for radio electric equipment and facilities.

**POSTE E TELECOMUNICAZIONI:** Describe the operational structure for us a little.

**Tormenta:** The Administration's organizational structure that tackles these tasks employs the following technical resources:

(a) A National Emission Control Center located in Rome, directly under the Central Directorate of Radioelectric Services, operating as a fixed station in the range below 30 MHz and equipped with a mobile unit set up for monitoring emissions of up to more than 20 GHz. This center is part of the International Monitoring System and performs pertinent activities in this context.

(b) Next we have 42 mobile technical-operational groups equipped with a total of about 60 mobile stations that are set up for monitoring emissions from 20 MHz to more than 20 GHz, under the Telephone and Telegraph Construction Circles, which do the listening and which monitor the fixed emplacement and coordinate the activities of the mobile stations.

(c) Sixteen stationary control centers activated at the various Telephone and Telegraph Construction Circles that monitor and check from a fixed position and coordinate the activities of the mobile stations.

**POSTE E TELECOMUNICAZIONI:** Let us now move on to activities in space.

**Tormenta:** Along with activities connected with the use of satellite telecommunications systems in the context of the international organizations INTELSAT, EUTELSAT, and INMARSAT for handling intercontinental, European, and maritime links, respectively, the Central Directorate of Radioelectric Services is concerned with work having to do with the activation of the program pertaining to the national telecommunications system (ITALSAT) and the system pertaining to the direct broadcasting of television programs from satellites (OLIMPUS and SARIT).

ITALSAT is a preoperational experimental Italian satellite for telecommunications that is scheduled to be orbited in 1990. The results of the tests will make it possible to more precisely spell out the technical characteristics of a future operational Italian satellite for telecommunications.

**POSTE E TELECOMUNICAZIONI:** By when are you going to have direct telecasts via satellite?

**Tormenta:** When it comes to direct broadcasting of television programs by satellite, we assume that the operational phase, using the SARIT satellite, will be started up in 1991-92 and that this phase will be preceded by an experimental phase to be implemented with the television channel that RAI obtained from ESA in the OLIMPUS satellite (financed to the extent of 32 percent by Italy). Its launch is scheduled to take place during 1989.

**POSTE E TELECOMUNICAZIONI:** Let us now talk about radio-link connections for private use.

**Tormenta:** Among the services that the Central Directorate of Radioelectric Services performs, we have the award of concessions for private use to operate radio links both for mobile radio service and for connections between fixed points in support of cable links. The element that characterizes the radio link connection as compared to the telecommunications connections in general has to do with the employment of the radio electric transmission means.

The radio link networks can be classified into two major categories:

- connections of the fixed type, when the network's terminals are located at fixed points that can be determined by geographic coordinates;
- connections of the mobile type, when the network's terminals are installed also on board moving vehicles (cars, boats, etc.).

**POSTE E TELECOMUNICAZIONI:** Who uses these networks?

**Tormenta:** The radio link networks for private use today are an almost indispensable instrument for the more correct management of important activities, such as those performed by the regions, the communities, the energy-distribution agencies (ENI [National Hydrocarbons Corp.], ENEL [National Electric Power Co.], gas pipeline companies, etc.), the highway companies of the vigilance institutions, the public utility services (hospitals, clinics), and other private enterprises (transportation companies, taxi companies, banks, etc.). [passage omitted]

This has made it necessary for the mobile ground service to adopt new and more rigorous criteria so as to improve the use of the radio electric spectrum.

To this end, the Ministerial Decree of 21 February 1986 issued standards to permit the more efficient use of frequencies.

Here are the most important points of this standard:

- rationalization and planning of frequencies;
- determination of technical parameters that identify the areas of service and that permit the more intensive reuse of frequencies in neighboring areas;

—imposition of cousership, that is to say, the use of the same frequency in the same service area upon networks that do not have a significant number of terminals.

Another sector under the purview of the Central Directorate deals with the problems relating to concessions and agreements for public-use services, such as those with RAI, TELESPAZIO, SIRM, and TELEMAR.

**POSTE E TELECOMUNICAZIONI:** Now let us take a look at the agreements. Let us begin with the agreement with RAI.

**Tormenta:** RAI—Italian radio-television—is the exclusive concessionaire for public circular radio broadcasting service throughout all of national territory, as per DPR [Decree of the President of the Republic] No 376, dated 1 August 1988, which approved the agreement between the state and RAI for a duration of 6 years.

The agreement provides for vigilance and monitoring tasks by the Central Directorate of Radioelectric Services regarding compliance with the provisions of the agreement. In particular, it makes the Directorate responsible for approving the long-term investment plans and the installation execution plans, verifying the correctness of the concession fee due the state, examining the prevention costs and gross receipts, consumption balance sheets, and biennial projections, as well as checking on the congruity of the gross receipts provided for in the agreement at least every 2 years. The Central Directorate furthermore provides for the investigation of the provisions of the additional agreements between RAI and the office of the prime minister concerning radio and television services beamed toward linguistic minorities and abroad, as well as their practical application.

**POSTE E TELECOMUNICAZIONI:** Let us now look at the agreement with Telespazio.

**Tormenta:** The Telespazio Co. is the concessionaire for the installation and operation of systems for providing telecommunications links by means of artificial satellites as per DPR No 523, dated 13 August 1984, which approved the agreement between the state and Telespazio for the duration of 20 years.

The agreement provides tasks involving vigilance and monitoring by the Central Directorate of Radioelectric Services concerning the obligations arising from the agreement and, in particular, makes the Directorate responsible for approving the long-term investment plans and checking on the proper handling of the concession rentals due the state.

The Central Directorate furthermore takes care of the determination of the rental for satellite connections to be paid by the domestic and foreign users.

**POSTE E TELECOMUNICAZIONI:** To finish up, give us a brief overview of the last two agreements.

**Tormenta:** The SIRM and TELEMAR companies are the not exclusive concessionaires of the installation and operation of radio electric stations on board ships by virtue of DPR 899 and DPR 900, dated 19 October 1982, for a period of 15 years.

The agreements call for tasks involving vigilance and monitoring by the Central Directorate of Radioelectric Services concerning the obligations arising from the agreement, and, in particular, the Directorate is responsible for approving the investment plans and checking on the payment of the exact concession rental amount due the state.

The Directorate also issues the authorization cards for the radio-telegraph inspectors on board ships and the implementation of the standard contracts that govern relations between the concessionaire companies and the merchant shipping outfitters.

**POSTE E TELECOMUNICAZIONI:** Looking at public and private radio and television broadcasting in Italy, we have a system that is developing continually, even restlessly, we might say.

**Tormenta:** As we know, in its ruling No 225/1974, the Constitutional Court, regarding the topic of reserving a monopoly on television broadcasts to the state, declared that exclusive control by the state without any appreciable reasons was blocking "the way to the free circulation of ideas," thus impairing "an essential asset of democratic life" and winding up "with the implementation of a kind of national autarchy of information sources."

Safeguarding public interests could and should therefore be ensured by the legislative branch "with an authorization system," but certainly not with "the exclusion of the right of the individual."

Law No 103, dated 14 April 1975, was passed in keeping with this ruling.

The standards introduced by the law were then amended by ruling No 202 of 1976, handed down by the Constitutional Court, which was designed to liberalize—albeit under conditions the legislative branch would have to spell out—activities involving transmissions via the airwaves in a local environment.

This ruling, which restarted the discussion on the choices made through Law No 103/1975, explicitly postulated rapid intervention by the legislative branch to guarantee the correct handling of the airwaves. Consequently, we witnessed a rather sudden acquisition of available frequencies—in some situations, also beyond those expressly earmarked for radio broadcasting—by a large number of private operators in the radio and television field.

**POSTE E TELECOMUNICAZIONI:** Why was it not possible to draft a frequency allocation plan?

**Tormenta:** In the absence of standards governing private broadcasting, this Administration found itself unable to draft a frequency allocation plan, which is an instrument that is necessary for putting together an orderly system of compatibility between Italian television broadcasting facilities (RAI—private outfits—foreign repeaters) and to take care of coordination with the radio and television agencies of other countries.

Then we got Decree-Law No 807, dated 6 December 1984 (converted, with amendments, into Law No 10, dated 4 February 1985) which, among other things—until passage of the general law on the radio and television system but, at any rate, no later than 6 months after the entry into force of the decree itself, which was later extended to 31 December 1985—facilitated the continuation of the activities of the individual private radio and television broadcasting outfits with the installations already in operation as of 1 October 1984. [passage omitted]

**POSTE E TELECOMUNICAZIONI:** Can we conclude with a look ahead?

**Tormenta:** I think that this is the way to go. It is to be hoped that the bill concerning the organizational rules for the domestic radio and television system will be passed promptly.

## NORWAY

### **EB-Nera Concludes Agreement With Libya for New Equipment**

55002494 Oslo AFTENPOSTEN in Norwegian  
19 Sep 89 p 19

[Article by Stein S. Eriksen: "Libya Contract for EB-Nera"]

[Text] Bergen. EB-Nera's division in Bergen has entered into an agreement for delivery of telecommunications equipment to Libya. The equipment will be used for the modernization of the telephone and data networks in Libya. The contract is worth 65 million kroner and the equipment will be delivered during the coming year.

According to director Asbjorn Birkeland, the export will occur in accordance with COCOM's rules.

"There is no regulation existing now which applies to export to Libya. However, it is mandatory to have an export license for all goods which can have a military application, irrespective of which country is the recipient," says press spokeswoman Sigrid Romundset of the Ministry of Foreign Affairs to AFTENPOSTEN.

"Can the Ministry of Foreign Affairs see to it that this particular concern will comply with the conditions for export of such equipment?"

"The Ministry of Foreign Affairs alone issues export licenses. It is the customs officials' duty to see to it that the export conditions are complied with," says Romundset.

EB-Nera has been working in Libya for approximately 10 years. With the newly completed contract EB-Nera has an overall commitment of 100 million kroner in Libya, director Asbjorn Birkeland told AFTENPOSTEN.

## SWEDEN

### **Ericsson CEO On Outlook For Firm**

55002487 Stockholm DAGENS NYHETER in Swedish  
26 Aug 89 p 15

[Interview by Kjell Brodda with Bjorn Svedberg, Ericsson CEO, date and place of interview not given: "Ericsson CEO Pursues Effectivity: We Will Continue to Grow"; first paragraph is DAGENS NYHETER introduction]

[Excerpts] Bjorn Svedberg, the chief executive officer, is not satisfied with having put the Ericsson company back on its feet. Now there is going to be an expansion—but only within the area of telecommunication. At the same time, he continues his assiduous pursuit of productivity, lower costs, and effectivity.

In a couple of years, Bjorn Svedberg will celebrate 30 years of employment with Ericsson. He has been the CEO [chief executive officer] since 1977. It has been a time of both prosperity and adversity. It was probably most difficult in the middle of the 1980's when company profits plunged.

**DAGENS NYHETER:** Looking back, how would you describe the years 1985-87?

**Svedberg:** It was difficult for two reasons. First of all, there were the problems following the intense focus on information systems, especially mini-computers, personal computers, and work stations. Sales were good, we increased our volume quite substantially, but profits were poor all the time.

"Second of all, the business was burdened economically by expensive and long-term investments in the systems operating technology and in building markets in Great Britain, France, and the United States," says Bjorn Svedberg.

The situation is different today. The information systems operation was reorganized and sold. Instead the telephone corporation, LM Ericsson, is concentrating on telecommunications. A strategy which, together with investments in technology and markets, is now beginning to show results, according to the Ericsson CEO. [passage omitted]



**DAGENS NYHETER:** Ericsson is forming a joint venture with the US-giant General Electric. Why not build up the organization yourself, why share such a lucrative market?

**Svedberg:** It is a question of selling in a broad American market. It is impossible for us to build such an organization ourselves. We bring different competencies to the venture. We know telesystems, GE knows markets. [passage omitted] **DAGENS NYHETER:** In 5 years Ericsson has the option of buying out the 40 percent that GE owns in the newly formed company, Ericsson-GE Mobile Communications. What will you do with it?

**Svedberg:** That is a natural part of an agreement. The parties need certain controls when cooperation is being discussed. The option is of very little interest to me. We are now starting something with GE and we are doing it long-term.

**DAGENS NYHETER:** Does GE have a corresponding option to buy out Ericsson if it so wishes?

**Svedberg:** There are paragraphs regulating that also. There are documents telling us how to act when we are no longer happy together. It is better to get that handled beforehand, it might be too late when you no longer can agree.

**DAGENS NYHETER:** Mobile telecommunication is growing by 35-40 percent per year. When will it become a larger business operation than the AXE-exchanges?

**Svedberg:** It will take time, since there is a strong growth on the part of AXE as well.

**DAGENS NYHETER:** The competition between telecommunication systems is razor-sharp in almost all the markets. Can Ericsson manage competitive prices while maintaining a reasonable margin of profit for the AXE-exchanges?

**Svedberg:** We are constantly forced to increase our productivity and to rationalize in order to counter the market pressure.

Furthermore, the market for public telephone systems has experienced great changes during the last couple of years. There are more actors in the marketplace, there is deregulation which is creating more dynamics and movement. It is not as cut and dried as it was before.

**DAGENS NYHETER:** The three greatest economies in the world—the United States, Japan, and West Germany—are white areas for Ericsson.

**Svedberg:** That is correct, but we are now making great efforts towards achieving a position in the United States, among them the joint venture with GE. I feel, however, that the company employers should be happy with the growth in market shares that Ericsson has managed in other markets. You cannot swallow everything at once. [passage omitted]

**DAGENS NYHETER:** Is it still possible to make great rationalization gains within the company?

**Svedberg:** Of course. In our case, however, it is definitely not a question of cutting down but of expanding. Ericsson is to a great degree a service organization and rationalization on our part is not only a question of reducing costs in the factories but perhaps even more of increasing the productivity in the offices and among all the executives at the subsidiaries. [passage omitted]

**END OF**

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